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U. S. DEPARTMENT OF AGRICULTURE,

BUREAU OF PLANT INDUSTRY—BULLETIN NO. 204.

B. T. GALLOWAY, *Chief of Bureau.*

AGRICULTURAL EXPLORATIONS IN THE FRUIT AND NUT ORCHARDS OF CHINA.

BY

FRANK N. MEYER,

AGRICULTURAL EXPLORER, FOREIGN SEED AND PLANT INTRODUCTION.

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LETTER OF TRANSMITTAL.

U. S. Department of Agriculture,
Bureau of Plant Industry,
Office of the Chief,
Washington, D. C., September 26, 1910.

Sir: I have the honor to transmit herewith and to recommend for publication as Bulletin No. 204 of the series of this Bureau a manuscript entitled "Agricultural Explorations in the Fruit and Nut Orchards of China," by Mr. Frank N. Meyer, Agricultural Explorer. This manuscript has been submitted for publication by Mr. David Fairchild, Agricultural Explorer in Charge of the Office of Foreign Seed and Plant Introduction.

Mr. Meyer's explorations in China, Manchuria, and Korea have brought to the attention of the Department many plants which promise to be of value to our agriculturists, either as forming the basis for new industries or as providing new and valuable strains of plants already known to us. Especially in fruits and nuts the Chinese Empire proves to be very rich, and as the similarity in soil and climate between the native habitat of these products and certain areas of the United States is close the possibility of introducing these new forms for direct cultivation and for breeding work is most promising.

Respectfully,

Wm. A. Taylor,
Acting Chief of Bureau.

Hon. James Wilson,
Secretary of Agriculture.

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AGRICULTURAL EXPLORATIONS IN THE FRUIT AND NUT ORCHARDS OF CHINA.

INTRODUCTION.

The Chinese as a race are great lovers of fruits, and to satisfy their taste they grow these wherever there is a chance to do so. They understand the arts of grafting, budding, and layering; and although they are far less successful in their attempts to originate new varieties they are able to preserve those that have been secured. But as with crops in general so with fruits; particular districts are often characterized by peculiar kinds, and it frequently happens that a certain variety of fruit is found only in a single locality. This can be explained by the fact that certain varieties have apparently developed from seed obtained locally, and on account of the lack of skill in transplanting trees such varieties have never been successfully introduced into other localities. However, when one asks about these things one is generally told that certain fruits do not do well in other sections; that even if successfully transplanted they lose vigor or the fruits never acquire the right flavor, etc.

Another strange thing is that the Chinese never prune their fruit trees, although the trees grow dense and their branches interweave. When the branches become heavily loaded with fruit they are propped up or tied with straw rope. The only fruit which is really scientifically pruned is the grape; but here it is apparently a case of absolute necessity—no pruning, no fruit.

In transplanting, however, the cutting back of roots is carried to excess, and this is one of the reasons why tree planting in China is considered such a hazardous undertaking.

What is lacking, however, in the care of the trees is made up by the excellent care bestowed upon the soil. All orchards are cultivated except those of the jujube, which do not need it, but even these are kept free from weeds. The custom is to plow the orchards before the winter sets in, then to let the ground lie rough during that season, to plow it again in the spring, and to harrow and cultivate whenever the ground needs it, so as to conserve the subsoil moisture. Manuring is not much resorted to for fruit trees, as fertilizers of all kinds are too scarce; but crops are often grown between the trees, and perhaps the trees obtain extra nourishment from the manure supplied to these crops.

Of insecticides little is known. In some districts the bark of fruit trees is scraped scrupulously clean every winter. The trunks of peach trees are often whitewashed, apparently to kill the insects in the bark. Some fruit growers clean the trunks of their trees every year by applying a bundle of burning straw to them at the approach of spring. Of spraying, however, nothing is known. It is a good thing that there are so many parasites in China which prey upon scale and other insects; for if it were not for them, fruit growing would be almost impossible.

A peculiarity of Chinese taste is that the race as a whole does not care for soft fruits. One may even see high-class Chinese ladies selecting hard apricots from a basket containing a mixture of ripe and green ones and relishing the crunching of the hard fruit between their teeth. At dinner parties, fine-looking but extremely hard pears are served and are keenly relished by the most highly cultured Chinese. For this reason one finds that although raspberries, red currants, gooseberries, and various other small fruits grow wild in the mountains, one never sees them cultivated, and the fruit on these wild bushes is only sparingly picked.

PERSIMMONS.[a]

CHINESE NAME, "Shi tze."

The persimmon (*Diospyros kaki*) is one of the most important tree fruits in northern China. Certain valleys are entirely given over to its cultivation, and the revenue derived from the sale of the fruit often forms the main source of income for certain districts. For instance, in the small village of Tai-dja-tchwang, near the large city of Pautingfu, Chihli Province, the writer was assured in January, 1908, that the persimmon crop of the previous autumn had brought in about 10,000 Mexican dollars, an amount which, though seemingly insignificant to us, is really a very large item in a small village in China. The most favored location for a persimmon orchard is at the foot of a hill or a mountain with a southern or eastern exposure, where the land consists of a warm decomposed granite soil that will allow the water to drain off easily and yet will retain enough to prevent the trees from suffering in case a drought should occur.

Trees are generally planted from 20 to 30 feet apart, and, as they are not fast growing, peaches and bush cherries are often grown between them for the first dozen years or so. When, however, the persimmons need the space, these secondary plantings are taken out

[a] In the opinion of the writer the persimmons of northern China constitute a different group of these fruits from the various forms of *Diospyros kaki* found in Japan, but as *D. kaki* is so exceedingly variable it may be a very difficult matter to assign different varieties to well-defined groups.

FIG. 1.—A THRIFTY PERSIMMON ORCHARD IN THE MING TOMBS VALLEY, NORTH OF PEKING.
Fruit pickers are sorting the fruit.

FIG. 2.—A NEAR VIEW OF SOME HEAVILY LOADED BRANCHES OF THE TAMOPAN PERSIMMON, A LARGE, SEEDLESS, NONASTRINGENT VARIETY.
Introduction Nos. 16912, 16913, 16921, 22350, 22362, and 22365.

and the soil is kept free from weeds and cultivated regularly. (See Pl. I, figs. 1 and 2.)

All the persimmons in northern China are ring budded or grafted upon a species growing wild in the mountains that bears small black fruit full of seeds. The ordinary Chinese name for this wild persimmon is "Ghae tsao," meaning black date, and statements have appeared in several papers that the Chinese use a black date—that is, a jujube—as stock for their persimmons. It is, however, an indisputable fact that the stock used in northern China is the *Diospyros lotus* (fig. 1). In central China probably other species are used, among which is at least one which has not yet been identified. (See Pl. III, fig. 1.)

FIG. 1.—The trunk of a persimmon tree more than a century old in a temple courtyard near Taianfu, Shantung Province, China. Note the clear division between the stock (*Diospyros lotus*) and the graft (*D. kaki*).

CULTIVATED VARIETIES.

Many different varieties of persimmons are grown in China, varying in size, color, productivity, etc. Of those that came under the writer's notice there is one that stands out above all others in excellent qualities. The fruit of this particular variety has a bright orange-red color, grows to a large size, measuring from 3 to 5 inches in diameter and sometimes weighing more than a pound. It is perfectly seedless, is not astringent, and can be eaten even when green and hard. It stands shipping remarkably well. The fruit is of a peculiar shape, having an equatorial constriction, which makes it look as if two fruits had been joined, or, to use a more terse expression, as if somebody had sat upon it (fig. 2). The trees are very thrifty growers when once thoroughly established. They reach a height of from 30 to 50 feet, and though the young branches are very erect the older ones bend down a good deal because of the great weight of the fruit. The trees seem to bear very heavy crops in some years, while

in other years the harvest is small. A drawback of a large crop is that the great weight of the fruit causes the large limbs to snap off unless they are propped or tied up. This, therefore, has to be done regularly. It seems that when the trees of this variety reach the age of 40 or 50 years they begin to decline in vigor; still, here and there old specimens may be seen that are near the century mark.

These large persimmons are mostly used when fresh. Foreigners in China are fond of eating them with a spoon, and after being kept in a cool place for some hours the fruit is very refreshing. They can be eaten while still hard, like apples. By careful handling and by keeping the persimmons at a low temperature they can be preserved for several months. To keep them through the winter the Chinese pile them in heaps, let them freeze thoroughly, and keep them frozen until they are needed. When wanted, they are simply put into a vessel with cold water to be thawed slowly, and then they are as good as when freshly picked. They can also be eaten

FIG. 2.—Four seedless Tamopan persimmons. Note the peculiar flattened shape of this fruit. Introduction Nos. 16912, 16913, 16921, 22350, 22362, and 22365.

when slightly frozen, like sherbet, and occasionally they are quite acceptable in that condition.

The variety described here is called by the Chinese "Ta shi tze," meaning big persimmon, or "Ta mo pan shi tze," meaning big grindstone persimmon, on account of its large size and flattened shape (fig. 2; Pl. II).. An abbreviation of the last, namely, Tamopan, has been suggested by the pomologists of the United States Department of Agriculture as a suitable name for this variety in the United States. (S. P. I. Nos. 16912, 16913, 16921, 22350, 22362, and 22365).[a]

[a] The S. P. I. numbers mentioned in this bulletin refer to the numbers assigned by the Office of Foreign Seed and Plant Introduction to seeds and plants received from foreign countries and distributed with a view to determine their adaptability to conditions in the United States. For detailed information the reader is referred to the series of publications known as Inventories of Seeds and Plants Imported, of which 20 have been issued up to the present time.

TAMOPAN PERSIMMON.

A seedless variety containing so little tannin while hard that it may be eaten like an apple. Scions introduced in 1905 produced this fruit in Fayetteville, N. C., in 1910. (Natural size.)

Another variety, called "Shau mo pan shi tze," or small grindstone persimmon, resembles the first in every respect except as to the size of the fruit, which is smaller, being from 2 to 3 inches in diameter. For this reason the variety is not very generally planted. (S. P. I. No. 22366.)

Another kind, called "Siang shi tze," or sweet persimmon, is extremely rare; in fact, there seems to be only one tree of it, growing in an old temple yard in the Pang Mountains, east of Peking. The fruit is flat, but has no equatorial constriction. It also has seeds, generally from three to six. The skin is so tender that the fruit can not be shipped well unless frozen hard. It makes up for these defects by being particularly sweet and fresh in flavor. (S. P. I. Nos. 21910 and 22597.)

Another variety is called the "Lien hua shi tze," or lotus-flower persimmon (fig. 3). The appearance of the fruit of this variety is

FIG. 3.—Seedless persimmons, showing their remarkable shape. This variety is called "Lien hua shi tze," or lotus-flower persimmon. Introduction Nos. 16910 and 22367.

very peculiar. It is not large, only 2 inches in diameter, and bears besides the equatorial constriction two cross furrows, varying in depth in different fruits. Sometimes the incisions are so deep as to divide the top of the fruit into four lobes, resembling a coarse, waxy flower; hence, perhaps, the name lotus-flower persimmon. At other times, however, the incisions are so slight as merely to make the fruit appear undulated. The fruit is seedless and of a bright orange-red color. The flavor is not as fine, however, as that of the larger varieties mentioned before. The trees have the peculiarity of making a big warty growth where they have been united to the wild stock, and can always be recognized by that means.

The trees of this variety grow to a greater size than the other kinds, being from 60 to 80 feet tall, with heavy trunks. (See Pl. III, fig. 2.) They also live to a much greater age. In general they seem to be heavier bearers, but the fruit is several weeks later in ripening than

that of the larger kinds. They have the habit of dropping their leaves before the fruit is entirely ripe, and then a large tree heavily laden with bright-orange fruit is one of the most beautiful objects in an autumn landscape. (S. P. I. Nos. 16910 and 22367.) [a]

Another variety bearing small fruit of a yellow color, which contains seeds, is called "New sien shi tze." The tree is a slow grower and has a whitish bark. It is a rare local variety, near Pautingfu, Chihli Province. (S. P. I. No. 22368.)

Another variety of small size, oblong shape, and scarlet color, containing seeds, and called "Whoe shi tze," or fire persimmon, comes from the same locality. (S. P. I. No. 22369.)

In the Provinces of Shantung, Shansi, Shensi, Honan, and Chekiang there are many other varieties of persimmons that are still waiting to be introduced.

Some of the less juicy varieties are used extensively in the manufacture of dried persimmons. This dried fruit closely resembles figs in appearance and is of an excellent flavor (fig. 4). It can be eaten raw or stewed, like dried peaches or apricots. Compote can be made from it and is very wholesome. It is very likely that new industries could be built up in those sections of our Southwestern States where these dry-fruited persimmons succeed well.

FIG. 4.—Large dried persimmons, said to have come from northern Honan, China. They are an excellent dried fruit, as extensively used in China as the dried fig is in America. Often eaten stewed like dried peaches or apricots.

The writer found a few specimens of apparently the true *Diospyros kaki* in a copse near the Tai ching kong temple, Laushan district, eastern Shantung. The trees look exactly like the cultivated *D. kaki*, but the fruit is greenish yellow and of an unpleasant flavor. It is the size of a small plum and the seeds are imperfect. The trees are very rare, and were seen only once. The fact that the priests call them the "Shan shi tze," or wild persimmon, may be an indication of their being the prototype from which the cultivated strains of persimmons, in northern China at least, have been derived.

[a] This variety was apparently described by Carriere as *Diospyros costata* in the Revue Horticole, 1870, p. 132, also 1871, p. 410, where a colored drawing of the fruit is given. It seems, however, that the Costata variety of kaki of the American trade is quite a different variety, being of a pointed shape and only very slightly furrowed.

FIG. 1.—A GROVE OF PERSIMMON TREES NEAR HANGCHOW, CHEKIANG PROVINCE, CENTRAL CHINA, GRAFTED ON THE WHITE-BARKED VARIETY OF STOCK.

FIG. 2.—A LARGE SPECIMEN OF THE LOTUS-FLOWER PERSIMMON TREE AT TAIDJATSOA, CHIHLI PROVINCE, CHINA.

Introduction Nos. 16910 and 22367.

THE WILD PERSIMMON.

[CHINESE NAME, "Ghae tsao," meaning black date.]

The wild persimmon (*Diospyros lotus*), upon which the natives of northern China bud and graft all their cultivated varieties, grows wild here and there in the mountains of northern China (fig. 5). In its native haunts it seems to love protected rocky situations in ravines along small mountain streams. The trees do not grow large; sometimes they are more in the nature of a big shrub. When given space and good soil, however, they develop into good-sized trees with

FIG. 5.—The wild persimmon tree (*Diospyros lotus*) in its native habitat in the mountains near Changli, Chihli Province, China. This tree is ordinarily used as a stock for the large-fruited edible persimmon. Introduction Nos. 17906 and 17907.

dense heads of dark-green foliage. Old trees also have a very dark-colored trunk which is deeply grooved and furrowed (fig. 6).

It is a most productive bearer, being literally covered in the autumn with small blackish fruits the size of large cherries. The fruits are edible when soft or after a frost, but there is very little flesh to them, as they contain from three to five rather large seeds. Children are very fond of them, and a tree of this variety in a yard will certainly be worth its space.

In China, where everything is of value, this fruit is sold in large quantities, especially in the neighborhood of Changli, Chihli Province,

and travelers passing through on the railroad from Peking to Mukden in the fall of the year are certain to see boys and men coming to the train and offering baskets of these small persimmons, together with walnuts, grapes, chestnuts, peanuts, and other natural delicacies.

In their wild state the trees vary considerably in productiveness, size, and color of the fruit. Near Changli there are a few trees that have decidedly elongated berries, covered with a bluish bloom and very sweet to the taste. In the Pangshan district there are one or two trees bearing globular fruit, which is perfectly seedless; and in the mountains southwest of Pautingfu, small, yellow-fruited varieties are occasionally found.

FIG. 6.—The trunk of a large specimen of the wild persimmon tree (*Diospyros lotus*), showing its black bark with deep irregular grooves.

As a stock, however, this persimmon may give to its grafted host a much longer life than the native American persimmon seems to be able to, for in China all the cultivated persimmons grow much older than they do in America. Of some varieties there, one finds trees grafted on this *D. lotus* that are centuries old and still very productive. (See fig. 1.) (S. P. I. Nos. 17173, 17905 to 17907, 18266, 18599, 19395, 22370, and 22599.)

PEACHES.

[CHINESE NAME, "Tau" and numerous variations.]

CULTIVATED VARIETIES.

As is well known, China is supposed to be the original home of the peach (*Amygdalus persica*). Whether this is correct has not been settled, for peaches have been found wild in the southern Himalayas near Mussuri, according to Royle, and in the province of Ghilan in

Persia, according to Buhse;[a] and the writer has been assured by native Persians and by travelers that small hard peaches occur wild in the mountains of northern Persia. But the question of whether or not the peach came from China we shall not raise here. So far as we know at present, three important strains of peaches have been developed in China, i. e., the Chinese Cling group, the Honey group, and the Peento group. That these groups have proved more successful in the southern portions of the United States than the varieties introduced from Europe is also certain, and that some of our most important commercial varieties to-day are wholly or partly of Chinese origin has been proved indisputably.[b]

The Chinese Cling group reaches its greatest perfection in those parts of China where the summer is hot and fairly dry and the winter moderately cold and dry. The Honey group is to be found mainly in the more southern and central parts, where the summers are hot and humid, while the winters are mild and wet. The last group, the "peen" peaches, apparently thrives everywhere, from the extreme south to the north; but it is the least grown of all the peaches in China, and it is only in the extreme south where the better, larger varieties of peaches fail that the little Peen peaches are cultivated somewhat extensively.

In China the thriftiest and healthiest peach trees are always seen at the foot of a mountain or a hill, growing in decomposed rocky or sandy soil, and it is in such locations also that the fruit has the finest flavor. In the neighborhood of large cities, like Shanghai, one finds peaches grown on rather low, rich land, but the trees have so many diseases to battle with and the fruit is so watery that one clearly sees that such places are not congenial to the habits of the peach.

In general, a Chinese peach orchard contains many different varieties. Seedlings and budded trees are mixed in an irregular planting. Pruning is not resorted to, but the soil is kept in a high state of cultivation so as to minimize the danger of the trees suffering from a lack of sufficient moisture. In case the season is very dry and water is available, the Chinese often irrigate their trees, for it gives them much larger fruit.

As to the variation of peaches in China, it is as great as, if not greater than, anywhere else. Of the Chinese Cling group, there are some most excellent varieties to be found in northern China. The best of them all is the "Fei tau," or Fei peach (see Pl. IV, fig. 1), Feitcheng

[a] Hehn, Victor. Kulturpflanzen und Hausthiere, in ihrem Übergang aus Asien, etc.

[b] Powell, G. Harold. The Chinese Cling Group of Peaches. Bulletin 54, Delaware College Agricultural Experiment Station.

being the name of a village where the orchards are located. These peaches grow to a large size, often weighing over 1 pound apiece, and are of a soft, pale-yellowish color externally, with a slight blush on one side. The meat is white except near the stone, where it is slightly red. The fruit is a clingstone with a very large, pointed stone. The skin is very downy. The fruit ripens in the early and middle part of October and has an excellent flavor, being sweet and aromatic. It possesses extraordinary keeping and shipping qualities, keeping until February if wrapped in soft tissue paper. Its shipping qualities are such that it is carried in baskets, slung on poles across the shoulders of coolies, from Feitcheng to Peking, a journey of eight days on foot. So famous is this peach that it is sent every year as a tribute or present to the imperial court at Peking; and even right on the spot where this fruit grows the most perfect specimens retail at from 10 to 15 cents apiece in Mexican money, a price which is about two-thirds that of the average daily wages of the Chinese field laborer.

Another fine variety of peach grows near Hsinchow, south of Pautingfu, in the Chihli Province. The writer has seen specimens of this peach in Tientsin that were fully as large as good-sized navel oranges. They are of a pale, whitish-green color, with almost no blush, and very juicy and sweet, though not aromatic like the Fei peach. They are clingstones, the seed being medium large. They are not very downy, and ripen toward the end of October. They are exported to all the large cities of northern China, and can rarely be purchased in the open markets, as they are apparently nearly always supplied to private customers.

Another variety, found near Shanghai, is the "Tsu mau tau," a large fruit with whitish meat, changing to red near the stone, something like our Chinese Cling.

There are several strains of the "Hong tau," or red peach, growing in the Chekiang, Chihli, Shantung, and Shansi provinces, and even in Manchuria. Some of these peaches are blood red and when cut through look more like a beet root than anything else. One variety in Shansi is even called the "Rho tau," or beef peach, so much does it resemble meat. These, so far as has been observed, are not so sweet as the Peento group of peaches.

Of the Honey peaches there are also several varieties in China. In the Shantung Province, especially, there seem to be some very fine types. One which the writer ate in Taingtau was a large, white-meated freestone of a very pronounced Honey-type shape, called "Yang tau" by the natives.

Of the flat or Peen peaches there are several varieties. Some thrive in the moist southern regions of the Empire, others are to be

FIG. 1.—VIEW IN AN ORCHARD OF THE FAMOUS FEI PEACHES AT FEITCHENG, SHANTUNG PROVINCE, CHINA.

FIG. 2.—A LARGE SPECIMEN OF A CHINESE JUJUBE TREE, CALLED THE "MU SHING HONG TSAO," OR POINTED JUJUBE, AT TSINGYUENHSIEN, SHANSI PROVINCE, CHINA.

found even at the edge of Manchuria. The writer has noticed greenish, red, yellowish, and white types, varying a good deal in size and appearance.

In the Chekiang Province there is a red flat peach which ripens in June and is called "Hong peento," or red flat peach. A white variety occurs in the neighborhood of Shanghai, bearing the name "Pak peento," meaning white flat peach. In the Shantung Province there are some excellent sweet flat peaches. Near Kiaochou one variety is called "Pai pien tau" and is deliciously sweet and juicy. A yellowish variety coming from central Shantung is also very fine. It is called "Huang peento," or yellow flat peach.

There are several forms of peaches in China that are intermediate between the different groups and can not be assigned to classes by themselves.

How far the peaches of northern China may make it possible for us to extend the peach belt northward by using them in hybridization is a question that might be well worth consideration. In the city of Kirin, Manchuria, where the thermometer sometimes drops to −40° F., there grows a small-fruited variety in a temple garden; and Prof. N. E. Hansen, of the South Dakota State College of Agriculture, has stated that rumors reached him on his last trip through Siberia of peaches growing in northeastern Mongolia, where the winters are very severe and very little or no snow covers the ground at that season.

One great difficulty in shipping bud wood of peaches is the fact that it does not travel very well. On the long journey over sea and land from China to America the buds become spoiled, although the wood may remain green and healthy. Owing in part to this fact, many excellent varieties of Chinese peaches have not as yet been successfully introduced.

NECTARINES.

Nectarines (*Amygdalus persica nectarina*) are apparently very rare in China, as the writer heard of them only a few times. Bud wood was obtained but once, and that was in Kwangning, Manchuria, where this fruit is called "Ta hsing-mei."

THE ORIGINAL WILD PEACH.

[CHINESE NAME, "Shan tau shu," meaning wild peach tree.]

In connection with the cultivated peaches a few words about a peculiar wild Amygdalus will not be out of place. This species, *Amygdalus davidiana*, was observed growing wild on the rocky south slopes of mountains in the neighborhood of Peking, Jehol, and in the neighborhood of Taitchow, Shansi Province (fig. 7). The plants in the wild state always grow shrubby and are from a few feet to 10

or 12 feet high; but when planted in gardens as ornamentals, as one often sees them in Peking, Tientsin, Chinanfu, etc., they reach a height of 30 to 40 feet and form a single trunk, sometimes over a foot in diameter (see Pl. V, fig. 1). The cultivated plants vary a good deal in the color of their flowers, which ranges from white to dark rose. The flowering period lasts but a very short time, but as the trees bear graceful dark-green foliage after their flowering they are quite ornamental.

The greatest value, however, that these wild peaches have for us is not so much in their ornamental appearance as in their use as a stock for almost all members of the stone-fruit group. The Chinese graft and bud upon them not only peaches but plums, "bush cherries" (*Prunus tomentosa*), flowering plums, and cherries, and all of these thrive upon this stock. They are also remarkably drought resistant, and as far as our preliminary experiments show they thrive equally well at Ames, Iowa, and at San Antonio, Tex. From the nature of the tree it will do especially well in those sections of the United States where there is only a limited summer rainfall and where winter temperatures do not fall too low.

FIG. 7.—A tree of the wild peach (*Amygdalus davidiana*) growing among rocks in the mountains near Fangshan, Chihli Province, China. This variety is commonly used as a stock in China. Introduction No. 22009.

The kernels of these wild peaches are used to flavor confectionery and some special dishes, but as they are full of prussic acid only very small quantities are used. The stones themselves are often made into rosaries, which the Buddhist priests use in their worship. Being deeply and irregularly grooved they are very artistic when cleaned and polished. (S. P. I. Nos. 17470, 17729 to 17731, 18262, 18595, 21227, 21908, and 22009.)

APRICOTS.

[CHINESE NAME, "Hsing," and other names.]

The apricot (*Prunus armeniaca*) is found in a wild state in many places in northern China, Manchuria, and northern Korea, and therefore it is no surprise to find it growing as a fruit tree on a large

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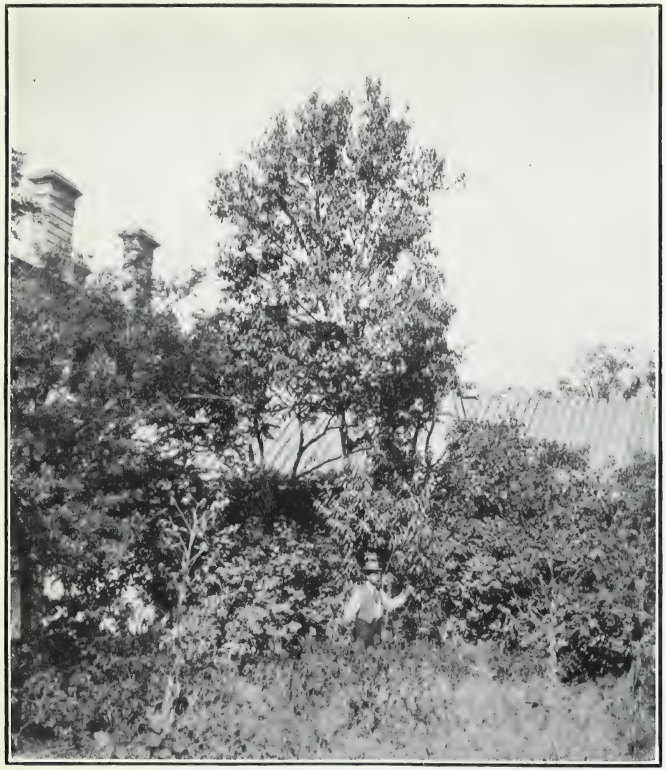

FIG. 1.—THE WILD PEACH (AMYGDALUS DAVIDIANA) COMMONLY USED AS A STOCK FOR STONE FRUITS.

This specimen, more than 40 feet tall, is in the grounds of the German Legation at Peking.

FIG. 2.—A HEAVILY LOADED TSAO OR CHINESE JUJUBE TREE (ZIZYPHUS SATIVA) IN A COMPOUND NEAR NINYANG, SHANTUNG PROVINCE, CHINA.

scale. There are red, orange, yellow, red-and-white, and white-spotted varieties in cultivation. In size there is also great variation.

The Chinese bud and graft their apricots upon seedling apricot stock and also upon the wild peach (*Amygdalus davidiana*). The trees generally are not grown in regular orchards, but in small lots of a few trees each. A decomposed granite or gravelly soil is preferred, and the trees thrive especially well on terraces on the mountain sides.

The Shantung Province is famous for its fine apricots, and there are several varieties there that are well worth introducing. There is also a strain of apricots in the Chihli Province that has sweet edible kernels. These kernels are sold as almonds and have created the impression that the almond occurs in China. However, I have never seen a single true almond tree in China, although I believe that in certain sections they would grow to perfection.

Apricots are nearly always eaten in China when not quite ripe, even small, hard, green fruit being eagerly eaten in early summer. Some of the less juicy and more acid varieties are cut in half and dried and sold during the winter months as delicacies. The Chinese say that a tea made from these apricots is very wholesome, purifying the blood and being laxative. Various compotes are made from the ripe and partly ripe fruit in which sugar and honey play a considerable part. Some of these delicacies are very good. (S. P. I. Nos. 17152, 17154, 20067, 20072, 22344, 22437, 22444 to 22446, and 22580.)

WILD APRICOTS OF NORTHERN CHINA, MANCHURIA, EASTERN SIBERIA, AND NORTHERN KOREA.

It has been proved that the apricot is able to stand far more cold and drought than is at present supposed. One finds the shrubby wild apricots all over the mountains of northern China and southern Manchuria, and forms which develop into regular trees occur in northern Korea, northern Manchuria, and eastern Siberia. The writer observed giant apricot trees growing in a mountain ravine near Tchangsong in northern Korea, fully 40 feet tall, the trunk of one measuring 10 feet in circumference. The fruit, though, is small and worthless, but as a stock plant and for hybridization purposes it might be of very great value.

That in the future large sections of the United States will be able to grow apricots where now there are none can be readily shown, for some of these Asiatic apricots have proved to be hardy at Boston, Mass., and even in the trying climate of Wisconsin. At the present time there is a large specimen of a central Asian apricot tree growing in the grounds of the State Agricultural Experiment Station at

Madison, Wis., and it has been thriving there for at least thirty years, without having suffered in the least from the low temperatures occasionally experienced there. (S. P. I. Nos. 16917, 18290, 19489, and 20068 to 20071.)

PLUMS.

The plum (*Prunus* sp.) is a fruit which is not very highly esteemed in China. Whether this is on account of its softness and its nonshipping qualities or whether because of its sourness we do not know, but plums do not form a big item in the fruit production of China.

The Shantung Province, which is the finest fruit-growing region of northern China, supplies the best plums, large red and yellow ones being even exported to various coast towns. In Peking one is able to obtain plums of one variety as late as the middle of November. This particular plum is yellowish green, with a slight blush on one side, and is of quite a sweet flavor. It is a freestone. (S. P. I. No. 17913.) There are a few other varieties grown in the neighborhood of Peking, but the writer saw the trees only when the fruit was gone and therefore could not obtain samples. Plums are grown in several places in Manchuria, as in Kwangning, Liaoyang, and Kirin. In this last place there is a red-fruited variety of medium size, not very fine eating, but excellent for preserves. As the cold gets very intense in Kirin, these plums may prove to be valuable in breeding. (S. P. I. No. 20241.)

The farthest north, however, that the writer found plums was in Khabarovsk. There, in the garden of Gen. M. Vedenski, he obtained bud wood of a yellow plum of good flavor that is able to withstand, unprotected, winter temperatures of $-45°$ F. (S. P. I. No. 19605.)

In central China are found peculiar plums. One apparently belongs to the species *Prunus triflora*. Another kind produces green fruit which is exported extensively, preserved in sirup or dried. It is of a beautiful green color and is much used in confectionery. The local name is "Shing mae." It is probably a form of *Prunus mume*.

There is another plum which has the appearance of an apricot, but is sour like the plum. It is very fragrant, has a downy, dull-yellow skin, and is a clingstone. The stones are peculiarly grooved, looking like wild-almond stones. This plum may be a hybrid between an apricot and a peach, or perhaps a new kind altogether.

In the Shantung Province there grows a plumcot, called by the Chinese "Lishing," which means plum-apricot. The fruit is large, red, and very sweet and aromatic. There seem to be about three known varieties of it, and the best ones are said to come from the neighborhood of Chingchowfu, Shantung Province. The few trees of this remarkable fruit that were seen by the writer had all the appearance

in leaves, buds, branches, general habits, etc., of hybrids between the apricot and the plum. They are all grafted upon seedling plum stock.

A species of very hardy wild plum occurs in northern Korea and eastern Siberia. It is tall and shrubby in growth, is found in high meadows or among bowlders, and bears large quantities of very sour blue plums of medium size. (S. P. I. Nos. 20073 and 20343.)

CHERRIES.

[CHINESE NAME, "Ying tao'rh."]

The real sweet cherries (*Prunus avium*) do not seem to occur in northern and eastern China, but instead of them they have in the moist, mild-wintered regions of the Yangtze Valley the ordinary Chinese sour cherries (*Prunus pseudo-cerasus*), the fruit of which is rather small and generally sour but very early.

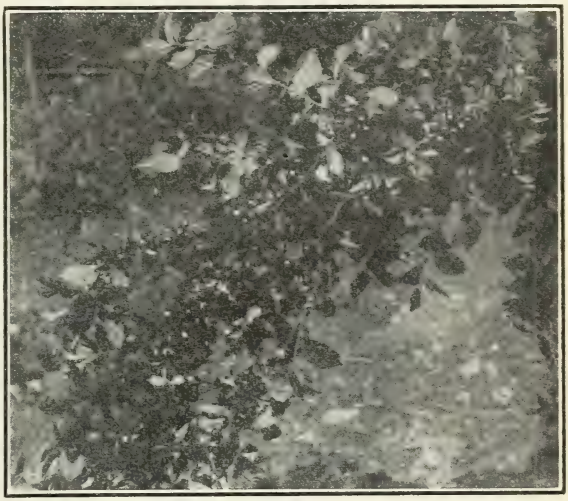

FIG. 8.—A heavily loaded branch of a large-fruited variety of the Chinese "bush cherry" (*Prunus tomentosa*) in a garden in Fongwhangcheng, Manchuria. Introduction Nos. 16918, 17732, 17733, 20075, 20240, 20287, 20288, and 21924.

An example of this earliness is found in the fact that a scion of one of these cherries (a sweet variety) was grafted in the spring of 1906 upon an ordinary Mazzard cherry in the United States Plant Introduction Garden at Chico, Cal., and the following year it bore fruit which was half grown on April 12, at a time when other cherries were just in bloom. (S. P. I. No. 18587.)

The most common cherries in northern China are the "bush cherries" (*Prunus tomentosa*) (fig. 8). These grow wild in the mountains of northern China, Manchuria, and Korea, and are found in dry, rocky places. In a wild state they are densely branched shrubs, bearing very small red fruit; the leaves are very tomentose. When cultivated, however, the plants become less dense in growth, the leaves lose their hairiness to a great extent, and the fruit becomes larger. There are varieties having fruit large enough to be worth consideration as a dessert fruit for localities where our ordinary

cherries fail. The Rocky Mountain regions and the regions farther south should be excellent for these bush cherries.

In propagating these plants the Chinese use three methods; i. e., layering, division, and budding upon the wild peach (*Amygdalus davidiana*). The first two methods are but sparingly employed on account of the great difficulties experienced in northern China in transplanting small-rooted plants, either in autumn or in spring, for both seasons are very dry; the last rains fall in September and the first rains often do not come until late in June. They find, therefore, that the best way to multiply these bush cherries is to bud or graft them upon the wild peach, which seems to be a very congenial stock and upon which they make an even faster growth than when left on their own roots.

These Chinese bush cherries prefer a decomposed rocky soil, but do well in almost all other soils when properly cared for. In the garden of Mr. and Mrs. Lykkegaard, of the Danish Mission in Fongwhang-cheng, Manchuria, they thrive even under the shade of tall elms, and when seen on June 30, 1906, bore masses of fruit. The preserves which Mrs. Lykkegaard gave the writer to sample were excellent. It is thought that this cherry has a future before it in America. (S. P. I. Nos. 16918, 17732, 17733, 20075, 20240, 20287, 20288, and 21924.)

There is also another cherry sparingly grown in northern China, a small tree or large shrub which has leaves and fruits more like our ordinary cherries, but which grows very dense and seems to be far less hardy than the bush cherries. It is probably the *Prunus pauciflora* of Bunge. It is sparingly cultivated in the neighborhood of Peking, but in the protected mountain valleys of the coast region of the Shantung Province several orchards of it were seen. It is not at all a common fruit tree. (S. P. I. No. 22361.)

There is also a wild dwarf cherry or plum (perhaps *Prunus humilis*) growing in northern China, Manchuria, Korea, and eastern Siberia. The shrubs grow from 1 to 3 feet high, occur on stony and sandy soils, and bear multitudes of scarlet fruits which are generally inedible on account of their sour and acrid properties. Some plants, however, produce slightly sweet fruit that can be eaten raw. The writer never cooked it but thinks that it would make good preserves. This dwarf cherry can very well be used as an ornament in gardens and rockeries. Its greatest value, however, lies in the fact that it can be utilized in breeding experiments. It may also become a fruiting shrub in those regions where fruit growing is now an impossibility. (S. P. I. Nos. 20076, 20085 to 20088 and 20342.)

PEARS.

[Chinese name, "Li."]

CULTIVATED VARIETIES.

Next to the peach, the pear (*Pyrus chinensis*) is probably the most highly appreciated fruit of northern China. Numerous varieties are grown, but not all of them are fit to be introduced into our western lands as acquisitions, for many of them are but seedlings and produce worthless fruit.

The Chinese grow their pears for the greater part on terraced fields and patches in the mountains; but in some regions, as to the south of Peking, where the soil is sandy and is easily blown about, one finds whole orchards of good pears growing upon the plains.

There is a story current among the foreign residents in China that a certain newcomer was asked his opinion of the Chinese pears. "Well," he said, "it depends on what you eat them as; as turnips they are certainly fine, but as pears I would rather not express any opinion." This statement is true so far as the greater number of the Chinese pears is concerned, but there are a few very good ones in China that are well worth cultivation by western people.

The best pear of northern China is, in the opinion of the writer, the quince pear, or, in Chinese, "Ya kwam li." This pear attains a large size, often weighing more than one-half pound; has a somewhat warty, dull-yellow skin, looks and smells like a quince, and has flesh that is mellow, juicy, and aromatic. It is considered so good that it is served upon the tables of foreign hotels in Peking and Tientsin. These pears do not bear rough shipment very well, but when carefully handled they can be kept for the greater part of a year. The trees prefer a sandy soil and are of a spreading habit, so that they require a great deal of space. (S. P. I. Nos. 17724 and 21253.) There is also a smaller variety similar to this, which is not much grown, as the fruit does not bring so good a price as the large variety does. (S. P. I. No. 17725.)

The second-best pear is the so-called "Peking pear," or, in Chinese, "Pai li," meaning white pear. This pear is round like an apple, with a short peduncle, a waxy, yellowish-white color, and has mellow flesh of a sweet flavor, resembling that of our own pears very much. It ripens late and, being a poor keeper, disappears very quickly from the markets. There is some variation in the size of the fruit on different trees. Some are very small, others large, but in general this Pai li is rather a small-sized fruit. (S. P. I. Nos. 16916, 17723, and 22432.)

Another mellow pear of pale-yellow color and of medium size and good flavor is the "Pei soo li," a rare local kind grown in the neighborhood of Jehol. (S. P. I. No. 21928.)

There is also the "Ta suan li," meaning big sour pear, having a very short peduncle and persistent calyx. It is greenish yellow in color. It remains hard until spring, then becomes mellow and has a peculiar, agreeable, sour taste. It is excellent for making into preserves to be used with game or meat. This variety grows near Jehol, China. (S. P. I. No. 21929.)

Then there is the "Mien suan li," or mealy sour pear, which closely resembles the preceding variety and grows near Kwangning, Manchuria. (S. P. I. No. 20260.) Another sour variety, called the "Mo pan suan li," or grindstone sour pear, is similar to the first-mentioned variety. This kind grows in the city of Liaoyang, Manchuria. (S. P. I. No. 20248.)

Another mellow pear, with an agreeable tart flavor, is the "Guarr li," growing at Jehol, China. This variety is rather small, has a short peduncle, is of yellow color, and has a rosy-red blush on one side. (S. P. I. No. 21931.)

Besides all these mellow pears there are a great number of hard pears in China and, strange to say, the Chinese prefer these to the soft ones. The best of all the varieties of hard pears of northern China is the "Ya'rh li." This pear is of large size, of a clear, light-yellow color, has the real pear shape, with a very long peduncle and a nonpersistent calyx. The flesh, although hard, is very juicy and sweet, and foreigners come to like it as much as the natives do. The shipping and keeping qualities of this variety are excellent, and it is to be obtained in northern China throughout the whole winter. There is a good deal of variation in the size and flavor of the fruit, caused by the difference in the trees or by localities, but on the whole this "Ya'rh li" is a fine large pear, well worthy of being introduced. (S. P. I. Nos. 16924, 17178, 17726, 20233, 20234, 20256, 22438, and 22442.)

Another pear, of very large size, ocher-yellow in color, but with coarse flesh, is the "Ma ti huang li," or horseshoe pear. The writer found it growing in gardens in Liaoyang and Kwangning, in Manchuria. (S. P. I. Nos. 20247 and 20251.) Another kind, famous for its fruit, which is dried and put up in boxes, is the "Hsiang sui li," or fragrant water pear. It grows especially well in the city of Liaoyang, Manchuria, and every year a present of a number of boxes of these dried pears is made to the Emperor at Peking.[a] The trees are very vigorous growers, but apparently shy bearers. They can, however, stand a good deal of cold and grow even in and near Kwangchengtze, Manchuria. (S. P. I. Nos. 20232, 20245, and 20253.)

[a] See Hosie, Alexander, Manchuria.

Near Kwangning, Manchuria, one finds not only this variety but also another, called the "Huang hsiang sui li," or yellow fragrant water pear. (S. P. I. No. 20271.) Then there is the "Mi li," or honey pear, a local variety growing in the Pangshan district, Chihli Province, northern China. It is rather small, egg shaped, with a very long peduncle, a canary-yellow color, a hard flesh, but very juicy and sweet, and is a good keeper. (S. P. I. No. 21912.)

The "Ten li," a rare local variety at Jehol, is of medium size, of a dark canary-yellow color, hard fleshed, but juicy and very sweet. It also is a good keeper. (S. P. I. No. 21930.)

The pears of western Shansi, of the Kwohsien district, are famous for their extraordinary keeping qualities. The "Yoh li," or oil pear (fig. 9), for instance, can be kept for more than a year. This pear is round-oblong in shape, with a long peduncle, is of a straw-yellow color with a reddish cheek, very fragrant, and, although of hard flesh, is very juicy and sweet. These pears are covered with a

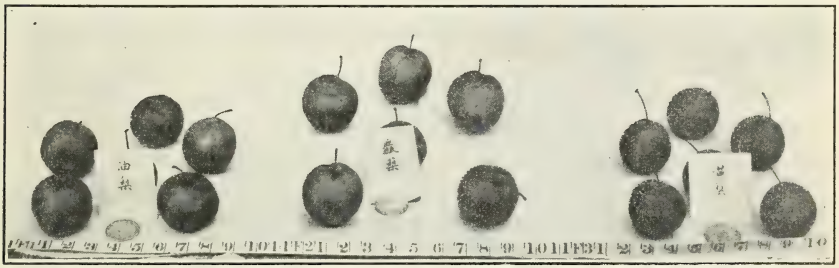

FIG. 9.—The best three varieties of pears of the Kwohsien district, Shansi Province, China. The group to the left is the "Yoh li," or oil pear; that in the center, the "Ben li," or furrowed pear; while the fruits to the extreme right are the "Huang li," or yellow pear.

fatty substance, which perhaps explains their keeping qualities and has given them their name, oil pear. The trees of this variety have a very spreading habit and grow to be very old, even near a century and a half.

A second one of these Kwohsien pears is the "Ben li," or furrowed pear (fig. 9). This is of medium size and apple shaped, with a long peduncle. It has four more or less deeply impressed furrows near the peduncle. It is a good keeper, but has not so fine a flavor as the "Yoh li." The trees of this variety grow with semi-erect branches and do not attain as great an age as the preceding variety.

The third good variety of this Kwohsien district is the "Huang li," or yellow pear (fig. 9). It is generally of large size, oblong in shape, with long peduncle, of a pale-yellow color, and fragrant; the flesh, although hard, is very juicy and sweet. It also is a good keeper. The trees have very erect branches.

In the Shantung Province there are some very large pears. The "O li" often weighs 1½ pounds, is green in color, and has hard flesh. The "Siu hua li" is a large yellow pear of the same province. This pear is so flat that the vertical diameter is only one-third of the horizontal, the shape making it look like a curiously flattened apple.

A pear of the Pangshan district, Chihli Province, called the "Ma li," or horse pear, is barrel shaped, with a long peduncle, of pale-straw color, and hard but juicy. It is a very good keeper and shipper. (S. P. I. No. 21914.)

There is a group of red pears in northern China, all of which are apple shaped and remarkable keepers and shippers. One found in the Poliping region, west of Peking, is called "Hong hsau li." (S. P. I. No. 22439.) Then there is the "Hong li," or red pear, of this group. Several varieties of it come from Tongchangdi, Shansi; Pangshan, Chihli; and Kwangning, Manchuria. (S. P. I. Nos. 20257 and 21911.) Another of these red pears is the "Hong bo li," from near Pautingfu, Chihli Province. (S. P. I. No. 22443.) Still another is the "Shui hong hsiau li," from Liaoyang, Manchuria. (S. P. I. No. 20244.)

All these pears are hard fleshed, of medium size, of slightly sour taste, and look so much like apples that one often has to examine them closely to detect the difference. There are also a number of mediocre pears in various places in northern China, like the "Bay li," from Kwangchengtze, the "Kuan hung hsian li," from Kwangning, Manchuria, which, we were informed, is grown only for the Emperor's use, and all the trees of which are known to the magistrate of the district. The "Liu yuea li," from Kwangning, Manchuria, needs to be kept for six months before it acquires the right flavor, while the "Ta yang li," from the same district, needs to be boxed for a month before it is in condition to eat. The "Chin tze li," from Kwangning, Manchuria, is said to have excellent keeping qualities. The "Yuan po li," the "Ta li," the "Yu chin li," the "Chang poa li," the "An li," the "Mien kuan li," the "Chin pai li," the "Ta ma li," the "Ping ding li," the "Ghua kai li," all from Kwangning, Manchuria, and the "Tang li," or russet pear, from the Pangshan district, Chihli Province, and from Kwangning, Manchuria, may be mentioned. The last two pears are apple shaped and have a russet color like the Japanese pears. They are good shippers and keepers, but the flesh is of a coarse texture.

Besides the varieties named there are scores of seedlings in almost every orchard that produce fruit of so little value that they bear no names. As a whole, however, some of these cultivated varieties of Chinese pears will in the future prove to be of very great value to the American fruit growers who will use them for breeding hardier, blight and scale resistant varieties, the more so, as we can point already to

our Kieffer, Le Conte, Garber, and some minor varieties which possess Chinese blood in a greater or less degree and which have made pear culture possible in sections of the United States where the European varieties have utterly failed.

WILD PEARS IN NORTHERN CHINA.

There are a few species of wild pears (Pyrus) in northern China which are of great importance to the Chinese and may become so to us. The true Chinese pear (*Pyrus chinensis*) is found growing sparingly in copses in mountain valleys in the Chihli and Shantung provinces. The writer always found these trees as isolated specimens. They are tall trees of open growth and bear small yellow fruit on very long peduncles. The calyx is deciduous. The leaves are few but large, long pointed, and are glossy green above and light green beneath. The trunks have a light-brown color; the bark comes off in strips and the trunks are fairly smooth. This type of tree has probably given rise to the hard-fleshed, yellow-fruited strain of pears, with deciduous calyxes, which is so commonly cultivated in northern China. This group prefers warm, sheltered nooks, and is not found in very cold or exposed localities. (S. P. I. No. 17176.)

There is another type of wild pear quite distinct from that mentioned above. This variety is found on the plains, at the foot of mountains, and here and there on the lower slopes of mountains and hills. It generally grows in clumps and even in large groves. The trees are densely headed and possess spiny branches. The fruit is small and flat, with a very short peduncle and a persistent calyx. It is greenish yellow in color and astringent and inedible before freezing, but after a heavy frost it becomes soft and yellow and has a slightly sour taste. The trees grow to large dimensions in favorable localities. At Shinglungshan, northeast of Peking, there are specimens that grow from 60 to 80 feet high and have trunks from 2 to 3 feet in diameter. The wood has a fine light-brown color and is utilized in the manufacture of printing blocks and wooden combs. The trunks are of a blackish color and, when old, deeply furrowed. This variety, or perhaps species, grows in the colder parts of northern China, in Manchuria, and eastern Siberia, and improved varieties are being grown as far north as Khabarovsk, where the mercury is frozen nearly every winter.

This species of pear has given rise, in all probability, to the mellow-fleshed pears of northern China; if not to all of them, certainly to the "Ta suan li," the "Mo pan suan li," and the "Guarr li," all three of which resemble very closely the wild type. (S. P. I. Nos. 17177, 19604, 20243, 20267, 20336, 20337, 21880, 21918, and 21923.)

Another type of pear, called the "Tang li," grows wild here and there in the Shantung Province. In characteristics it stands midway

between the two last-mentioned species. The trees are found as isolated specimens and look very much like the real *Pyrus chinensis*, but are of denser growth and have large, beautiful, glossy leaves, while the fruits are rather large, have medium-long peduncles and persistent calyxes, and are mealy when ripe. Their color is a rusty brown. A small group of pears, the "Tang li" group, has probably been derived from this strain of wild pears. (S. P. I. No. 21983.)

The last in the list of the wild pears in northern China is the *Pyrus betulaefolia*, or "Doh li." The fruit of this pear does not grow any larger than a good-sized green pea. It hangs in bunches, covering the whole tree, is brown in color, and does not become soft and edible until late in the fall. The trees generally do not grow very tall, but form extraordinarily dense heads of branches. One often finds well-developed specimens growing on the alkaline or sandy plains. They thrive equally well on cliffs and along streams, but they are then of a more shrubby nature. This pear is extensively used as a stock for cultivated varieties in those parts of northern China where the winter is not too severe. It stands alkali wonderfully well and will grow even in pure sand.

The Chinese claim that this pear is far easier to grow from cuttings than to raise from seed. I can not vouch for this statement, but I know that the people apparently always have some stock on hand, though it has often a wonderfully straggling habit. This pear may be of use to us as a shade and ornamental tree, being covered in the spring with an amazing quantity of flowers, followed by a multitude of small fruits, which hide among the dense mass of foliage. (S. P. I. Nos. 17727 and 21982.)

APPLES.

[Chinese name, "Ping kua."]

CULTIVATED VARIETIES.

The apples (*Malus* spp.) of China are very inferior in flavor to the western kinds. In fact, the true apple, *Malus sylvestris*, does not do very well in eastern China, and beyond a few specimens in the gardens of foreign residents it seems to be unknown to the Chinese. In the Shantung Province and in some parts of Mongolia there are said to be native apples of superior flavor, but I never had the good fortune to come across them, unless it were some apples I tasted in the garden of the late Doctor Nevius, an American missionary in Chefoo, who introduced many kinds of western fruits into China.

The larger, whitish varieties of apples which the Chinese cultivate seem to belong to the *Malus prunifolia* group. The trees have a wide-branching growth; the leaves are tomentose, ovate, with rounded

ends and long petioles. The fruit though often attractive in appearance is soft, spongy in texture, and insipid in flavor. The trees do not grow in very cold and exposed regions and do not seem to be able to stand much drought.

Belonging to this group is the "Pai ping kua," or white apple, from the environs of Peking and Pautingfu. The fruit varies a good deal in size. It is much used for preserves. (S. P. I. Nos. 22371 and 22440.) Mention may be made of the "Hong teng ku," or red apple, from near Pautingfu (S. P. I. No. 22372), the "Sha hoa tze," a medium-sized apple of whitish color, with red cheeks, from Kwangchengtze, Manchuria (S. P. I. No. 20230), the "Ping kua" (S. P. I. No. 20280), and the "Pin tze" (S. P. I. No. 20277), from Kwangning, Manchuria, and the "Sa kua," from the Pangshan district, northern China, and Kwangning, Manchuria. The last is a flat apple, like the saucer peach. It has an insipid flavor and does not keep well. (S. P. I. Nos. 20276 and 21915.) The "Ly tze" is a sour red apple, also of a flat saucer-peach shape and a poor keeper. It is from the Pangshan district. (S. P. I. No. 21916.)

There is another group of apples in China, the trees of which are of large growth, the branches erect, the leaves pointed, very little tomentose, or even glossy. The fruit is small, mostly of a red color, and though often mealy is generally sour in flavor. This group stands more cold, drought, and privation than the first class. The trees thrive as far north as Khabarovsk, on the forty-fourth parallel of latitude. In all probability they have been derived by selection and perhaps hybridization from the wild crab apple (*Malus baccata*), which is abundant all over northern China, Manchuria, northern Korea, and eastern Siberia.

To this group belong the "Hua hong," a large red crab apple growing in Kwangchengtze, Manchuria (S. P. I. No. 20231), the "Gai tang," the fruit of which is as large as a good-sized cherry, dark red in color, with a bluish blush, and growing near Jehol, northern China (S. P. I. Nos. 21879 and 21927), and a variety called by the Russians "Reinetka," growing vigorously in Khabarovsk, Siberia, and probably the same as the "Hua hong." (S. P. I. No. 19603.)

THE WILD CRAB APPLE.

The Chinese in northern China and Manchuria and the Russians in Siberia graft all their apples on the Siberian crab apple (*Malus baccata*), which, as stated before, grows wild all over northeastern Asia. There is great variability in the size of the tree. Sometimes one finds a specimen on an exposed, dry mountain side, in appearance like a gnarled shrub, but bearing an abundance of fruit. Again, in good fertile spots one may see it as a tall tree from 40 to 50 feet high

and having a trunk a couple of feet in diameter. The productivity of these wild crabs is something marvelous. The little apples, about the size of small green peas, are eagerly collected by the Russians and the Chinese and are either eaten fresh, dried, or made into preserves.

From what the writer has seen of the hardships this wild crab apple is able to stand in its native haunts, it would seem that there are few places in the northern portions of the United States where it would not succeed. Even if it is not suitable as a fruit tree it is a fine ornamental plant, both when in bloom and when loaded with its thousands of little scarlet fruits. (S. P. I. Nos. 20137, 20237, 20238, 20339 to 20341, 21065, 21878, and 21922.)

QUINCES.

The quince (*Cydonia* sp.) most often seen for sale on fruit stands in China is the true Chinese quince, *Cydonia sinensis*, or in the native vernacular, "Mu kua." The trees are by no means common throughout northern China. One has to travel to central Shantung before finding them growing even sparingly in gardens, and it is only farther south that they are cultivated on a large scale for shipment. The fruit grows to an exceedingly large size, being sometimes even a foot long and weighing 10 pounds apiece. It is never eaten by the people of northern China, but is used by them exclusively for perfuming their rooms. The well-to-do classes have in the winter time a large bowl filled with the fruit and placed upon a table in a cool room, so that it perfumes the whole atmosphere with a delightful spicy aroma. Foreign residents, however, have found that these quinces make excellent sweetmeats, and they preserve them in various ways. The writer has tasted jellies and jams made from them that were unexcelled for fine, aromatic flavor. (S. P. I. No. 17954, under *Cydonia japonica*.)

There is also a variety of the Japan quince (*Cydonia japonica*, S. P. I. No. 22581) cultivated sparingly in the mountains near Peking. The fruit is small, of a greenish color, covered with a brown bloom, and very fragrant. It is called "Pei mu kua," and is also used for perfuming rooms, but mostly by the poorer classes, it being very much cheaper than the Chinese quince.

Another variety of the Japan quince is called "Mu li." Its fruit is larger than that of the preceding one, has a very spicy odor, and is used for the same purpose as the first two. (S. P. I. Nos. 18601 and 22629.)

In the Shantung Province there were also observed in a few temple yards cydonias that grow to be tall trees, from 30 to 40 feet in height, with a very smooth bark that comes off in strips. The leaves

are round-oblong, serrated, with very short petioles, glossy, dark green above and light green underneath. The fruit looks like the European quince. It is very woody and not edible, but it possesses a pleasing, spicy odor. The writer noticed two other varieties, one having round fruit and called "Hsau kua shu" (S. P. I. No. 21984), the other with oblong fruit, the "Mu li shu."

Here and there in central China, as in Hangchow and Soochow, the Chinese cultivate in earthen vessels a very uncommon dwarf form of *Cydonia japonica* var. *maulei*. It is called the "Lo hai tang," and seems to be used for ornamental purposes only. (S. P. I. No. 22984.)

HAWS.

[CHINESE NAMES, "Hong kua," "Suan dzao," and "San li hong."]

In northern China there are whole orchards of an edible haw (*Crataegus pinnatifida*). These trees have all been grafted. They are carefully cultivated and the fruit is harvested and shipped all over the land, very much, in fact, as apples are with us. (See fig. 10.) The fruit is of a bright-red color, fairly hard, and of an agreeable sour taste. There is considerable variation in the size of the fruit and its acidity, but the best kinds are as large as good-sized crab apples and are only slightly acid.

Haw fruits are extensively used in the manufacture of sweetmeats and preserves, and foreigners and natives are equally fond of them. In the foreign embassies in Peking one is served with cake that has preserved haw fruit as a filling. Foreign missionaries supply visitors with a kind of haw jelly, and the Chinese give a jar of haw preserves as a New Year's present. The fruit of a rather sour, dry-meated variety is sliced and dried and kept for winter use. In this form it is called "Suan dza." The Chinese make much use of it during the winter months for brewing a tea which they claim acts as a blood and system purifier. This dried fruit can also be stewed, and by the addition of sugar it makes a good compote, tasting not unlike apple preserve. It is one of the fruits that can be safely introduced into America and will not have to wait long to become popular.

Aside from its fruit it is a very handsome, ornamental tree, making a dense head of dark-green foliage, turning into gorgeous red and yellow in the fall. The height rarely exceeds 30 feet, and some varieties branch out almost at the ground, thus making them well suited for ornamental trees on lawns. (S. P. I. Nos. 17171, 17739, 17882, 17883, and 19405.)

The largest and best haw fruit comes from the Shantung Province. It is especially in the neighborhood of Taianfu that one finds remarkably large-fruited varieties, the trees of which are very productive.

There are many seedlings of this haw in cultivation which in general bear but small fruits, and these smaller ones are nearly always more acid than the larger varieties. This is an advantage in one way, for this acidity makes them an excellent substitute for cranberries, a fact which the American missionaries in the Shantung Province have learned to their advantage. Since this haw is a very hardy tree and can stand considerable drought and heat its fruit might take the place of cranberries in sections of the United States where the latter are hard to obtain at the present time, as anyone

FIG. 10.—A group of trees of a large-fruited variety of the Chinese haw (*Crataegus pinnatifida*) near Changli, Chihli Province, China. The fruit of this variety is extensively employed in the preparation of marmalade and jelly. Introduction No. 17882.

could grow one or two of these trees to supply his own wants. (S. P. I. No. 21987.)

The stock upon which the Chinese graft their large-fruited varieties is the wild *Crataegus pinnatifida*, growing in many places in the mountains in northern China, Manchuria, northern Korea, and eastern Siberia. It is mostly seen as a shrub. In favorable locations, however, it grows into a small tree. In general, the wild tree or shrub is well furnished with long thorns, while the large-fruited cultivated trees are entirely without them.

Even in the wild state there is a good deal of variation in the appearance and behavior of the plants. Some specimens have very small leaves and are heavy fruiters; others, again, are very large leaved and bear few fruits, etc., but they all seem able to stand drought, cold, and adverse conditions to an unusual degree, and they therefore hold out great promise as to their future behavior in the United States. (S. P. I. Nos. 17170, 17751, 20108, 20109, 20350, 21921, and 22607.)

LOQUATS.

[Chinese name, "Bibaw."]

The loquat (*Eriobotrya japonica*) is in all probability indigenous to the hills of the mild-wintered, moist regions of central-eastern China. The writer observed some specimens growing wild among the scrub in the region near Tangsi, Chekiang Province. That section is one of the most noted loquat regions of China. As far as the eye can see one observes nothing but loquat orchards, growing luxuriantly on the low, rich land, where the roots never suffer from lack of water.

There are several varieties of loquats in cultivation, differing a good deal in flavor, color, and quality. The finest kind is considered to be the white loquat, the fruit of which is said to be of a pale-yellowish color and of a very fine flavor. It is called in Chinese "Pai bibaw," or white loquat. (S. P. I. No. 22976.)

The different varieties are all grafted on seedling stock; but as the Chinese are not always very successful with their grafting, they generally lose a large percentage of them, and thrifty young plants are exceedingly hard to obtain.

The Chinese consider the loquat a very profitable tree, although apparently it bears a good crop only every two or three years. Rev. Alexander Kennedy, a missionary in Tangsi, who assisted us a great deal in obtaining various plants, stated that in the spring of 1906 the loquat crop was so great in his vicinity that from the village of Tangsi, alone, twenty thousand dollars' worth of fruit was exported.

JUJUBES.

[Chinese name, "Tsao."]

CULTIVATED VARIETIES.

The jujube (*Zizyphus sativa*) is quite an important fruit in northern China, grown everywhere in those sections where winter temperatures are not too low. The trees can stand a remarkable amount of neglect without any apparent detriment. They are found equally productive on a piece of strongly alkaline land or in an inner courtyard where the ground has been tramped down until it is as hard as stone. (See Pl. V, fig. 2.)

The soil best suited to this fruit seems to be a porous clay, charged with more or less alkaline matter, like the loess in northern China. The jujube also thrives better in regions where the rainfall is rather light and the winters dry and cold than in moist, mild-wintered sections.

In general, jujubes are grown in small groves or as single trees, but here and there one also meets regular orchards of them, covering perhaps 10 or 20 acres. In some localities the farmers plant them in rows through the fields. It seems that planted in this way, at a distance of from 5 to 10 feet apart, they produce the largest quantity and the best quality of fruit. When in regular orchards the distance apart is from 15 to 25 feet, depending upon the variety and upon the personal preference of the planter.

The farmers, here and there, also have the habit of ringing their trees every year, claiming that thereby they considerably increase the crop. (See Pl. VI, fig. 2.) The jujube is about the only fruit tree around the roots of which the soil is not regularly cultivated, because the yield is found to be just as large without this work as with it.

There are a great many varieties of the jujube in cultivation, probably not less than a hundred, varying in size, color, shape, quality, etc. As the varieties do not come true to seed, the trees are mostly propagated by the suckers which are nearly always found at their bases. Root cuttings can also be taken. Some varieties, however, do not readily produce suckers, and root cuttings are not successful. Then the Chinese resort to grafting the scions on wild stock. This grafting practice, however, seems to be confined to only a few localities, where the growers are men of considerable experience.

The fruit of these jujubes is nearly all of a shining brown color and is very plump when fresh. When dried it has more of a red color and becomes shriveled. It is eaten fresh, dried, preserved in sugar, stewed, or smoked. Some varieties are better for one purpose, others for another.

The different varieties that came under the writer's notice are enumerated as follows:

"Ming tsao," a rather large-fruited variety, growing near Peking and Jehol, China. The fruit is of a light brown-red color, from 1¼ to 1½ inches long, of oblong shape, and quite sweet. The trees remain small, grow very erect, occupy but little space, and are almost devoid of spines. They sucker and spread very rapidly when young.

"Ya tsao," growing near Jehol, China. The fruit is large, from 1½ to 2 inches long, tapering toward the peduncle, of a dark brown-red color, and not very sweet. The trees remain small, grow fairly erect, but are very spiny, and sucker and spread freely.

FIG. 1.—AN OLD SPECIMEN OF THE "LANG TSAO," OR MELLOW JUJUBE, AT TSINTZE, SHANSI PROVINCE, CHINA, SHOWING THE PECULIAR HABIT OF GROWTH CHARACTERISTIC OF THIS VARIETY.

Introduction No. 22686.

FIG. 2.—A NEAR VIEW OF THE TRUNK OF A CHINESE SEEDLESS JUJUBE TREE NEAR LAOLING, SHANTUNG PROVINCE, CHINA, SHOWING THE RINGS THAT HAVE BEEN MADE EACH YEAR BY SAWING THROUGH THE BARK TO MAKE THE TREES BEAR MORE HEAVILY.

"Mu shing hong tsao," growing at Tsintze, Shansi. The fruit is of a red-brown color, of medium size, oblong, tapering toward the apex, and can be kept a long time. The trees grow to a large size and become very old. (See Pl. IV, fig. 2.) When old they are very little branched, have no spines, and sucker but little. (S. P. I. No. 22684.)

"Hu ping tsao," meaning bottle jujube, growing in Tsintze, Shansi. The fruit is large, oblong, and of a shining red color. It is usually eaten after having been soaked a couple of months in weak Chinese spirits. This variety is considered locally as the best grown. The trees do not reach a large size, are planted close together, from 6 to 8 feet apart, are spineless, and sucker but little. (S. P. I. No. 22683.)

"Tsui ling tsao," meaning fragile jujube, growing in Tsintze, Shansi. The fruit is oblong, of red color, is said to break easily on falling, whence its name, and is a poor keeper. The trees grow to medium size, are spineless, and sucker but little. (S. P. I. No. 22685.)

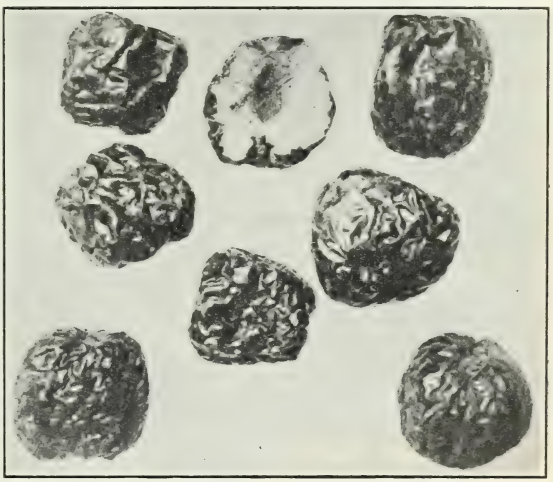

FIG. 11.—Chinese smoked jujubes. The jujubes of this variety are called "Yuen ling tsao" or "Su hsin tsao" when fresh, but go under the name of "Ghae tsao" when smoked. They are largely shipped to southern China, where they find a ready market.

"Lang tsao," or mellow jujube, growing in Tsintze, Shansi. The fruit is small, oblong, red colored, and of a mellow, sweet flavor. It can not be kept long. The trees grow large and spread out very much, behaving quite differently in this respect from other varieties. (See Pl. VI, fig. 1.) (S. P. I. No. 22686.)

"Yuen ling tsao" or "Su hsin tsao," a round-fruited variety of dark brown-red color, found near Hweigörr, Shantung. Its fruit is smoked and exported in large quantities to southern China, where there is a great demand for smoked jujubes (fig. 11).

"Wuhu tsao," or seedless jujube, growing near Laoling, Shantung. This variety is said to be the only seedless variety in the whole Chinese Empire and is sent every year as a present to the Emperor at Peking. It has made the Wuhu magistracy, where it grows, famous all over China for its jujubes. The fruit is not absolutely seedless, but the kernel is so soft that it is practically imper-

ceptible when eaten and the fruit may therefore safely be called seedless. The fruits are rather small, of a dark brown-red color, and very sweet. They are excellent when boiled with rice or millet, make delicious stewed compote, and can be eaten dried with peanuts, the same as raisins and almonds. Foreign soldiers in Peking, with whom the writer tested a few pounds, were remarkably fond of them.

The trees grow only to a medium size. They are usually planted in rows through the fields at distances of from 8 to 10 feet apart. The Chinese ring the trees every year at the time of the setting of the fruit by sawing through the bark close to the base of the trunk. They say that if this is not done half of the fruit is thrown off by the tree, so that by this method they double the crop. (See Pl. VI, fig. 2.) The fruit of the ringed trees, however, is not so sweet by far as that coming from the unringed trees.

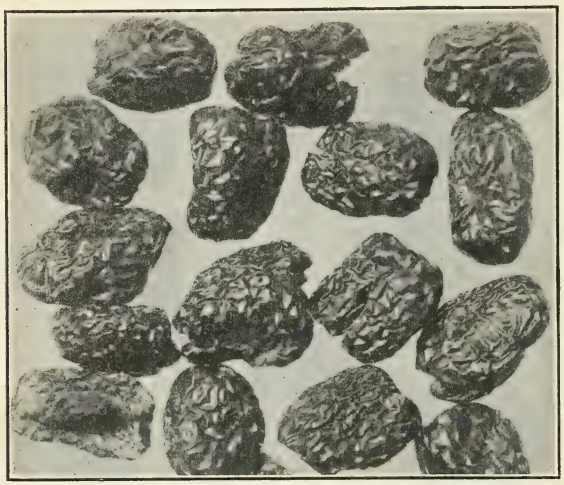

FIG. 12.—Chinese jujubes of the "Chin sze tsao" variety, used extensively in the manufacture of the so-called honey jujubes ("Mi tsao"). A remarkably sweet variety.

"Chin sze tsao," a rather small but very sweet variety, growing at Laoling, Shantung (fig. 12). This variety is said to be one of the best for the manufacture of the celebrated honey jujubes. The fruit is of a light brown-red color; the trees are of medium size, with much of the habit of the seedless jujube.

"Tun ku yu tsao," a flat jujube, growing near Chinanfu, Shantung. This variety has a dark-brown color and is remarkably sweet; considered locally one of the best varieties for eating fresh.

"Twen ku lu tsao," another flat variety, growing near Chingchowfu, Shantung. The fruit is of medium-large size, of dark-brown color, and is also very sweet. It does not keep long. The trees are of medium growth, bear but little fruit, and sucker very little. They are propagated by being grafted upon the wild stock.

Besides the varieties mentioned there are scores of others that did not come under the writer's personal observation, but which are mentioned in various Chinese publications. One variety is even said to be white.

There is an article often served to foreigners in China in homes and in hotels looking strikingly like the Persian date. This is the celebrated "Mi tsao," or honey jujube (figs. 13 and 14). To prepare this the Chinese take large, sound, dried fruits and boil them thoroughly in sugared water, after which they are taken out and dried in the sun or wind for a couple of days. When sufficiently dry they are given a slight boiling again and are partly dried. When dry enough to be handled, the skin is slightly slashed lengthwise with a few small knives tied together. Then the fruits are given a third boiling, now, however, in a stronger sugar water, and for the best grades of honey jujube honey is added. When this process is finished they are spread out to dry, and when no longer sticky are ready to be sold. The best grade of these honey jujubes sells for 40 cents Mexican a pound, and is obtainable in only a few of the larger cities of China. In case the American people should take to growing the jujube, they would find a ready market for the better varieties for use in the manufacture of various confections.

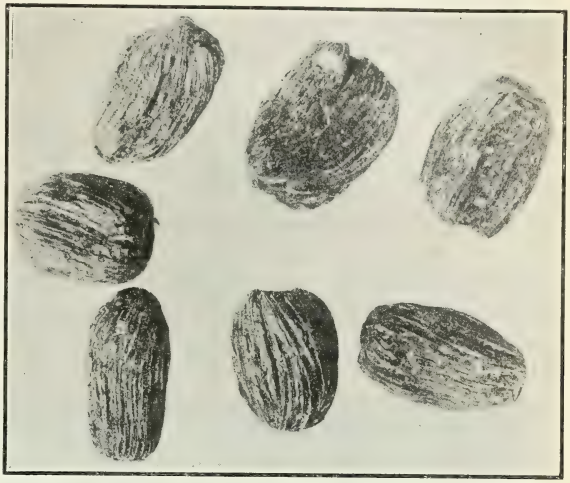

FIG. 13.—Small honey jujubes, not as high priced as those shown in figure 14, though of as good, if not better, flavor.

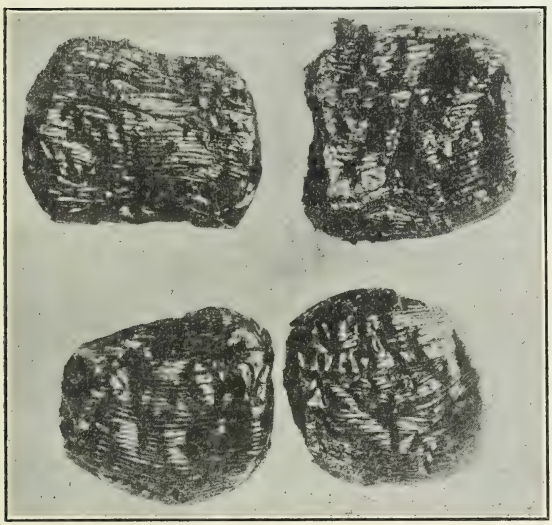

FIG. 14.—The best of the Chinese honey jujubes. These are excellent candied fruits which deserve to become well known in America. The trees withstand considerable alkali and drought.

DRAGON'S-CLAW JUJUBE.

With so many varieties of jujubes in cultivation it is not surprising that one kind has been produced that has an ornamental value. This is the quaint "dragon's-claw" jujube (*Zizyphus sativa tortuosa*) or, in Chinese, the "Lung tsao tsao shu." This variety has peculiar gnarled and twisted branches and is very rare. The rich Chinese prize them highly as horticultural curiosities. The trees are propagated by being grafted on the wild jubube. (S. P. I. No. 22914.)

THE WILD JUJUBE.

Finally we come to the original wild jujube (*Zizyphus sativa spinosa*) from which the cultivated varieties have been derived. This species grows wild on most of the walls of the northern China cities, and is also to be found in the most out of the way, stony, and sterile locations. It has ugly hooked spines, which easily tear one's clothes and break off in one's flesh. The fruit is small and round, of a brown-red color, and has a pleasant sour taste. It is collected by old women and children, and an inferior paste and preserve are made from it. The very spiny branches are used as fencing material and keep intruders away by their forbidding appearance. In general, this wild jujube grows only as a bush; but when left alone in favorable locations it reaches the size of a tree from 20 to 30 feet high, with a trunk more than a foot in diameter. It becomes less spiny when large; but it is still far from easy to climb one of these trees without the loss of some blood. (S. P. I. Nos. 17892 and 21995.)

GRAPES.

[Chinese name, "Poo tao."]

CULTIVATED VARIETIES.

The grape is as much esteemed by the Chinese as by western nations. *Vitis vinifera* is not a native of China, but was introduced there from central Asia by the Emperor Wu ti, who in the first century before our era sent ten envoys to various countries west of China, who brought back grapes and alfalfa.[a]

How many varieties of grapes were originally introduced it would be hard to ascertain, but there must have been several, for at present a good many varieties are being grown in northern China.

There is a very fine white variety cultivated near Changli, having round berries and possessing a good flavor. It ripens in the latter part of September (S. P. I. No. 17155). Another white kind occurs near Hsuenhuafu. This variety is the highest priced of all the Chinese

[a] Sampson, Theo. Grapes in China. Notes and Queries on China and Japan, April, 1869, p. 50.

grapes and is to be had only in limited quantities. The bunches are rather large, the berries much elongated, and the flavor is sweet and refreshing. It is a good keeper, the fruit being kept in paper-lined baskets or in jars in cool places until February (S. P. I. Nos. 16927 and 17156). There are also some seedless white grapes in northern China, one variety being apparently the same as the Sultanina, or so-called Thompson Seedless. (S. P. I. No. 17160.)

There are also several varieties of purple grapes, central Shansi, especially, being renowned for them. One variety can be kept for almost a whole year if the fruit is carefully put in baskets and jars and kept in cellars which are cooled by ice.

The culture of grapes in China is somewhat different from what it is in other lands. The plants are always grown trained over arbors, with very long main leaders. In the month of October, just after a cold snap, the vines are taken from their supports, skillfully pruned, and then tied together in long bundles. If the main leaders are very long they are bent around to make the bundle shorter. Pits from 4 to 6 feet deep are dug, wide enough for a man to work comfortably in and as long as the tied-up bundle of the grapevine requires. The vines are now laid down in these pits, which are covered with sorghum stems and old matting, over which a couple of feet of soil is put (fig. 15). Care is always taken to leave a few air holes, which are left open in warm weather but are closed up entirely in case a blizzard occurs. The root from which the stems originate is never taken up, but some old matting is put around it and the whole is covered with soil to the depth of a few feet.

FIG. 15.—A grapevine of a tender variety just removed from a trench where it was protected for five months. Photographed March 31, at Tientsin, China.

In visiting a vineyard in China in the winter, unless one's attention were drawn to it, few people would suppose that the apparently barren spot they were walking upon was covered in summer with a luxuriant growth of choice grapes. This practice of burying the grapevines that would not be able to pass unprotected through severe winters is certainly worthy of general attention. It can not

be done in the United States on a large scale, as the high price of American labor would be prohibitive, but in the Rocky Mountain section of the United States, especially, the people could have choice varieties of grapes for their own table use if they would take the trouble to protect the vines in winter in this way.[a]

RAISINS.

Raisins are not common in China, and those seen there are a small, seedless, greenish-white kind, said to be made from grapes grown in the neighborhood of Kweihuacheng, Mongolia, a district with very dry air.

VARIOUS SPECIES OF WILD GRAPES.

[CHINESE NAME, Shan poo tao.]

In northern China, Manchuria, and eastern Siberia a wild grape (*Vitis amurensis*) grows. This grape is found in dense thickets overrunning shrubs and trees. It is a rather prolific bearer, the bunches and berries being small, however, and rather sour; but the plant is so remarkably hardy, standing temperatures of −40° F., that there may be a possibility of using it in hybridization experiments. In its wild state it is collected by the Chinese and Russians and eagerly eaten. In eastern Siberia the writer also tasted some inferior wine and some good vinegar that had been made from it by a Russian settler. (S. P. I. Nos. 19477, 19600, 20347 to 20349, and 22601.)

Besides the *Vitus amurensis*, one finds here and there various other wild species. In the Boshan district is found a wild grape called "Ya pu tao" (S. P. I. No. 21979). From it the Chinese make a fairly good wine, which is remarkably strong. In the Lungtung district of Shantung there are two other species, both bearing edible berries. In the Mokansan region, to the southwest of Shanghai, one finds grapes that have many spines along their branches and bear edible berries. They are even sparingly cultivated by foreigners. In all probability they are a species of Spinovitis (perhaps *S. davidi*) and might be fitted for hybridizing with better varieties to produce strains of grapes that could stand a greater degree of moist heat than our present good varieties are able to do.

THE CITRUS GROUP.

Numerous, indeed, are the various species and varieties of Citrus in China. As is well known, southern China is supposed to be the home of the sweet orange (*Citrus aurantium sinensis*). Besides this species,

[a] This method is practiced to a limited extent with tender varieties in the Northern States and in Canada.—WILLIAM A. TAYLOR.

mandarins and tangerines (*C. nobilis*) and kumquats (*C. japonica*) are in all probability natives of China, the last two probably coming from the mild, equable climate of south-central China. In the vicinity of Hangchow wild pomelos occur, while in Shensi and Shantung *Citrus trifoliata* is found in a wild state.

There are said to be more than 80 different kinds of edible oranges growing along the southeastern coast of China and on the numerous islands fringing that coast. A few that came under the writer's notice are as follows:

SWEET ORANGES.

There are several varieties of the sweet orange (*Citrus aurantium sinensis*) in China. They appear on the markets in winter and are chiefly from southern China. One variety, said to grow near Canton, is of medium size and very sweet. It is especially in favor with the foreign residents. Blood-red oranges of this type are also occasionally seen.

MANDARINS.

Under mandarins (*Citrus nobilis*) we may group the large flat fruits with a loose, generally dark orange-red skin. The trees need rather high temperatures to thrive. The leaves and wood are of a much stronger growth and are very much darker colored than those of the tangerines. The trees are not so prolific. The Chinese possess some excellent varieties of mandarins. One very large one is perfectly seedless and very sweet. It grows especially well on the islands off the coast between Foochow and Amoy. Some excellent varieties are also found in the Szechwan Province and above Ichang on the Yangtze River. To the same group belong the so-called bitter or tonic oranges from Wenchow, Chekiang Province. This fruit possesses a bitter flavor that makes it very acceptable on the breakfast table, it having tonic properties similar to those of the pomelo.

TANGERINES.

Under tangerines (*Citrus nobilis*) are placed the small loose-skinned varieties, mostly of a light orange color and generally quite well supplied with seeds. The leaves are small and of a light green color. The branches, although thin and long, are closely massed, thus making the trees very dense and round headed. The trees seem to be able to stand a considerable degree of cold. There are several varieties, differing much in size and flavor. One rather small variety is grown extensively near Hangchow in the Chekiang Province. When these groves were visited in the spring of 1906 many trees were completely bent down and a good many limbs had been broken off by a

10-inch snowfall two days before, but although the trees had been shattered by the snow they had not suffered at all from the cold.

KUMQUATS.

The kumquat (*Citrus japonica*) is a small fruit which is very much appreciated in China. All who have ever had a good Chinese dinner know how this fruit is served, preserved in sugar or sirup. It is worthy of being more widely known by the western nations than it is at present. There are a few varieties of this fruit cultivated by the Chinese differing in size and shape. The elongated form, however, seems to be the most highly appreciated and is found in the fall of the year in all the markets and fruit stands, being sent even as far north as Peking.

POMELOS AND SHADDOCKS.

Several varieties of pomelos and shaddocks (*Citrus decumana*) are found in China. The orchards, however, exist near Amoy and Canton and the writer never saw any trees except some dwarfed ones in nurseries. The fruits themselves are plentiful in Shanghai, being served even on the tables of the foreign hotels. One variety of pomelo is particularly good and is called by foreigners the "Amoy" pomelo. It is of a flat shape, has a loose skin, and its segments separate as easily as those of an orange. It has a sweet flavor and when it is fresh the fruit is quite juicy, differing from some other kinds that are extremely dry, even when not old. This class of sweet pomelos, the segments of which separate easily, is never served as a breakfast fruit but is eaten as a dessert, served in segments. Coming after the oranges have gone, this variety fills a decided gap in dessert fruits on the tables of people living in the Far East. (S. P. I. Nos. 21870 and 25506.)

LEMONS.

In China the lemon is apparently not grown as a fruit tree, for lemons are rather scarce and expensive, being imported from outside countries. In Peking and Tientsin the price of lemons in winter is sometimes as high as 20 cents in our money apiece.

As an ornamental plant, however, lemons are very much appreciated as dwarfed pot plants. The idea is to have as many fruits as possible on the smallest possible plant. A plant with a dozen or more fruits on it will sell in Peking in the winter for as much as $10. The particular variety used for this purpose slips easily and is raised from cuttings. The fruit is large, very smooth, and thin skinned, very juicy, only slightly sour, and is practically seedless. (S. P. I. Nos. 21905 and 23028.)

FINGERED LEMONS.

The fingered lemon, or "Buddha's hand" (*Citrus medica digitata*), is a queer fruit largely grown by the well-to-do Chinese as an ornamental pot plant. The strange fruits are greatly prized by the people as presents and as religious objects. They are supposed to bring good luck to the household. Indeed, so highly are they valued that in the north a good sound fruit sells for one Mexican dollar.

NOVEL CITRUS FRUITS.

In Peking one can sometimes buy in the winter some strange orange-like fruits. They have the appearance of a warty Satsuma orange, but the flesh is fibrous, sour, bitter, and not edible. They are used as room perfumes, like quinces. (S. P. I. No. 21904.)

In the neighborhood of Hangchow there is a peculiar citrus fruit growing wild upon the hillsides. The fruit is very large, 4 inches long by 2½ to 3 inches in width. The skin is of a dark yellow color, thick but loose, and contains a peculiarly pungent volatile oil. The pulp is of a refreshing sour flavor, between that of a lemon and a pomelo; in fact, it serves as a lemon for foreigners in that part of China. It is full of large flat seeds, resembling those of the pomelo. The trees grow straight and tall, are rather bare branched, and are furnished with large spines. They are capable of standing severe frosts and heavy snowfalls without being hurt, and might therefore be utilized as stock in the United States. The Chinese names for this fruit are "Schu yu" and "Ning bon." (S. P. I. No. 18439.)

Besides the citrus fruits mentioned, the Chinese cultivate several others, some of which the writer was not able to see in fruit. In some small nurseries one often finds twenty or more citrus varieties, all grown in pots and vessels as dwarfed specimens. Some are slipped, others have been layered, some are grafted upon *Citrus trifoliata*, others, again, on seedling stock of some kind or other. They are all in great favor as pot plants and there is much demand for them.

NAGIS.

[Chinese name, "Yang mae."]

The nagi (*Myrica nagi*) thrives to perfection on the slopes of the hills in the Chekiang Province. It also occurs on the Chusan Islands and in other places in southeastern China. It prefers a well-drained situation, and where found wild it often grows in rather poor, rocky soils, in semishady localities. The wild shrubs or small trees grow very straggling and open. In cultivation, however, where they get full sunlight and proper care, they grow dense and

bushy and are very ornamental, especially in early summer, when the masses of carmine fruit contrast beautifully with the glossy light-green foliage.

Several varieties are cultivated in China, varying in color from dull white, yellowish red, rosy red, and carmine to black red; in size, from a cherry up to a medium-sized plum; and in flavor, from very acid to refreshingly sweet. The best varieties are grafted upon wild or seedling stock, but it is no very easy undertaking to do this. The trees can be transplanted only with the greatest difficulty, and for that reason plantations extend but very slowly. Wherever the Chinese nagi could be grown in the United States its fruit would be a very pleasant addition indeed; for besides being very agreeable when eaten fresh, it can be stewed, preserved, and used in a multitude of ways. Very good pies are made from it, and as an ingredient in fruit sirup it is very refreshing. (S. P. I. Nos. 22904 to 22906, and 22977.)

POMEGRANATES.

[CHINESE NAME, "Shuh lu."]

Pomegranates (*Punica granatum*) are not indigenous to China but were introduced there from central Asia in the beginning of our present era. To-day they are still considered somewhat as exotics, for the plants are mostly grown as ornamentals. The fruit is considered to be of more or less medicinal value.

In the Shantung Province, however, one finds large specimens of pomegranates growing in the gardens, and quite a number of different varieties can be seen. There are dwarf varieties that grow only a few feet tall and bear but a few small scarlet fruits, while others grow from 15 to 20 feet tall and bear fruits one or more pounds in weight. There are varieties that have a white rind and are red inside and other kinds that are white both outside and inside. A great part of all the pomegranates in China are double flowered and are grown only for ornament. There are pygmy varieties with double dark-red flowers, others with light-red ones; while among the tall kinds one finds every degree of variation, ranging through pure white, striped, and pale-red flowers to very dark red ones.

LITCHIS.

[CHINESE NAME, "Lei tchee."]

The litchi (*Litchi chinensis*) is one of the most popular fruits in China; in fact, in the south it seems to occupy about the same place that the strawberry does with us, as far as appreciation is concerned. No good dinner, even in northern China, is really complete without some of these delicious little fruits. They are eaten fresh, dried, or

canned. The litchi has the same reputation that the pineapple has, that is, it is thought by some to be improved by being canned.

There are a great many varieties of litchis as to size, color, flavor, and size of kernel. They are strictly semitropical plants and in China they occur along the coast only as far north as Foochow, on the twenty-sixth parallel of latitude. They require a rich, loamy soil and should not be allowed to suffer from lack of moisture. The trees are propagated by inarching upon seedling stock, but the Chinese admit that the plants are hard to propagate. The dried fruits of the litchi are the so-called Chinese nuts which have become quite common in our American markets.

LONGANS.

[CHINESE NAME, "Long an."]

The longan (*Euphoria longan*) is a near relative of the litchi. The fruit is much smaller and not nearly so well flavored when raw. When canned, however, the longan is improved considerably and is perhaps even of a more delicate flavor than the ordinary litchi. It is also a strictly semitropical tree, but can stand more hardships than the litchi. The fruit, which is naturally brown, is generally artificially changed to a chrome yellow. It is eaten fresh, canned, or dried. In the last condition one can obtain it at the Chinese New Year time even in the most northern cities of the Empire. There are several varieties of longans, differing in size of fruit, productivity, and size of kernel. Their northern limit of growing seems to be, like that of the litchi, the region around Foochow.

FIGS.

The fig (*Ficus carica*) is grown in northern China only as an exotic, mostly in pots and tubs. In the milder parts of China, however, one finds here and there big specimens out in the open. The writer noticed black and white varieties, but the fruits are not great favorites with the Chinese, apparently, and figs are but sparingly grown.

GUAVAS.

Guavas (*Psidium cattleyanum*) are never seen in northern China and are but sparingly met with in central China, and then only as pot plants. Farther south, however, they seem to be grown in regular plantations, as has been reported by various writers.

BANANAS, PINEAPPLES, ETC.

Bananas, pineapples, carambolas, and various other strictly tropical fruits are grown in the extreme south of China; but although the writer observed the fruits in northern markets he was never able to see the plants growing in their various districts.

THE CANARIUM.

The canarium (*Canarium* sp.) closely resembles our green olive. It is hawked all over the Empire and is mostly eaten fresh, or while still unripe is pickled in brine. It is considered an excellent promoter of digestion and an appetizer. Besides the fresh fruit, one can obtain it dry salted, dry sugared, or preserved in sirup. In the last two ways it has a very pleasing flavor, comparing favorably with our preserved citron rind, and could safely be introduced into our western lands as a table delicacy. The shrubs, or small trees, can not stand much cold. Their northern limit on the coast of China seems to be Foochow.

MULBERRIES.

[CHINESE NAME, "Pai sang shu."]

In the neighborhood of Peking a variety of mulberry (*Morus alba*) is grown which produces large white fruit that is very sweet to the taste. It ripens in early June, and is but sparingly met with for sale.

ACTINIDIA.

ACTINIDIA KOLOMIKTA.

There are several species of Actinidia in the Orient. The most common in northern China, Manchuria, northern Korea, and eastern Siberia is *Actinidia kolomikta*. This vine grows here and there in dense masses in the open forests, sometimes covering large areas, crawling over bowlders and smothering all small shrubs. There is much variation in its habits. Some plants are of an open growth, while others are extraordinarily densely branched.

The fruit, too, varies in size and shape, some kinds being as small as and even rounder than a gooseberry, while others are elongated and of the size of small plums. The color is either bright or dull green.

In the foliage one observes at times some curious variations of color. Some plants produce leaves that are either entirely or in part white, silvery colored, or spotted; other plants show a similar variegation, but in the red or rosy-red tints. These variegations are strikingly beautiful when seen in the wild state. The white one produces the effect of a shrub covered with thousands of large white flowers.

The fruit of *Actinidia kolomikta* is edible and is eagerly collected by the inhabitants of the countries where it occurs. The Russian settlers in eastern Siberia dry it and keep it for winter use. They call it "kishmis" and use it baked in bread and pastry. (S. P. I. No. 19479.)

ACTINIDIA ARGUTA.

The species *Actinidia arguta* also occurs wild in Manchuria and northern Korea. It is of much stronger growth, but is seen far less often than the first species. The fruit is larger than that of *Actinidia kolomikta* and is also collected and eaten by the natives. According to information obtained from Unsan, northern Korea, the fruit is called "tara" in that region and is well liked.

ACTINIDIA CHINENSIS.

[CHINESE NAME, "Yang tao."]

The species *Actinidia chinensis* seems to be the largest and most important of all. It grows in the mild-wintered Yangtze Valley, and as far as the writer was able to ascertain is not cultivated at all. The vine is a very rank grower, attaining large dimensions. The fruit is of the shape of a small hen's egg, has a rough skin, and is of a rusty color. It tastes something like a gooseberry, but has other flavors added to it. The missionaries prepare a jam from it that is of very good quality. Plants of this species have been widely distributed of late, and will no doubt show in the near future whether they are productive enough to warrant the very large space they require for successful development. (S. P. I. Nos. 11629 and 21781.)

MISCELLANEOUS SMALL WILD BERRIES.

As has been stated, the Chinese do not seem to like soft fruits very well, especially the wild, berrylike kinds. This is probably the reason why they have never developed any of the excellent wild forms of Rubus which they possess. The ordinary red raspberry (*Rubus idaeus*) grows in large quantities in the mountains of northern China, Manchuria, and eastern Siberia, and although the fruit is not very large it is of a good flavor.

Various other species of raspberries, thimble berries, blackberries, and all sorts of intermediate forms bearing white, yellow, red, or black fruit occur all over China. Dr. Augustine Henry and Mr. E. H. Wilson have collected scores of good species in central and western China, some of which in the near future will give rise to entirely new strains.

The genus Ribes has some promising species in the Orient. Here and there in the high mountains of northern China one finds wild gooseberries and various kinds of wild currants that seem to be able to withstand a drier climate than the varieties of western Europe and may therefore be used in hybridization work.

When traveling through northern Korea in the summer and fall of 1906 the writer found in the highlands of the Changpektchang region hundreds of acres covered with fine blueberries (*Vaccinium myrtillus*), on which his party feasted until their tongues and palates were dark purple and their teeth were on edge. These blueberries are certainly worthy of cultivation in cold, bleak districts where other berries will not grow. Even in the wild state there is a considerable degree of variation among them as to size and sweetness of fruit, and superior varieties could easily be selected and multiplied.

Here and there in shady, moist places, in the same localities where the blueberries were growing, masses of mountain cranberries (*Vaccinium vitis-idaea*) were noticed, but the scarlet, fine-looking berries were somewhat too bitter to be palatable.

In the cooler parts of northern China, Manchuria, northern Korea, and eastern Siberia the snowball (*Viburnum opulus*) often occurs in large masses. In some places the natives collect the scarlet, juicy berries and make preserves of them by boiling the fruit and mixing sugar with the paste.

Schizandra chinensis is a small climbing vine, growing in shady thickets in Manchuria, northern Korea, and eastern Siberia. It bears long, dense clusters of scarlet berries which are eaten by the natives, who claim that the fruit possesses medicinal properties, being a blood purifier. The dried fruit is exported as medicine in large quantities from Manchuria to various Chinese cities. To us, however, this plant would be of value mainly as a graceful ornamental climber. (S. P. I. Nos. 19602 and 20361.)

Besides these regular fruits, many wild things of minor importance are used for food. One of these is too curious to omit. There grows in some parts of China a species of hackberry (*Celtis sinensis*). This tree is sometimes so badly attacked by a gall that it becomes stunted. The Chinese, however, eat these galls while green and before the insect inside is entirely grown. They say that the flavor is exactly like that of a cucumber, and for this reason the tree is called the "Shan huang kwa shu," or wild cucumber tree.

COLD-STORAGE METHODS IN CHINA.

It is a fact of peculiar interest that certain methods or practices which our present generation considers to be particularly its own are found to have been practiced for no one knows how long in some of the oldest countries of the globe. Cold storage is one of them. The Chinese understand the principles of cold storage thoroughly. They are able to keep grapes from one year to another by storing them in deep, dugout cellars that are kept cold with baskets of broken ice placed among the baskets of fruit.

The fruit merchants usually keep perishable fruits in their stores by means of large earthen jars with very thick walls. Broken ice is put in the bottom of the jar and upon this are placed woven wicker baskets in which the fruit is kept. The jar is closed with a wooden cover that often has a strip of felt around it. It is remarkable how well such a simple contrivance serves its purpose.

To obtain the necessary ice there is great activity in the neighborhood of cities and villages in the winter time. Ice even as thin as half an inch is gathered. It is stored in houses with very thick mud walls and kept there nearly the whole year.

NUTS AND NUT CULTURE.

Nuts are appreciated by the Chinese to the same extent that they are all over the world, but nut culture is as little practiced in China as it is elsewhere, for nut-bearing trees and shrubs seem to have the reputation of not needing much cultivation. One therefore finds that a great many of the various nuts obtained in China have been collected from trees and shrubs in a wild or semiwild state.

The nuts which came under the writer's observation are as follows:

WALNUTS.

[CHINESE NAME, "Ho to."]

The walnut (*Juglans regia sinensis*) is a native of northern China and thrives to perfection in the rich, loamy soil of some of the broad, sheltered valleys of that country. In some sections the trees are grown in regular orchards, in other localities one finds them planted here and there as solitary specimens. The latter practice is especially common in the narrow mountain valleys, where terraces have often been made to supply the trees with a sufficient quantity of soil.

The Chinese have not learned the art of grafting or budding the walnut, and all the trees, therefore, are seedlings. Hence, there is an enormous variation in the habits of the trees and in the size and quality of the nuts. In some sections very superior strains of nuts exist, while elsewhere the quality is poor. In the vicinity of Changli, Chihli Province, there are some walnut orchards in which the trees vary to a remarkable degree. Some produce small hard-shelled nuts of poor flavor, while others bear fine large nuts, with a really fine flavor, and having shells so thin that they can be cracked with the fingers like a peanut. Between these extremes one finds many gradations in hardness of shell, size, and flavor. It is very likely that some kinds of these Chinese nuts may prove to be much hardier than our present Persian strain of walnuts and in all probability they will thrive especially well in certain sections of the southern Rocky Mountain region. (S. P. I. Nos. 17745, 17746, 17943 to 17946, 18256, 18257, 18263, 18603, and 18604.)

WILD WALNUTS.

[CHINESE NAME, "Shan ho to."]

At the present time the walnut is but very sparingly met with in the wild state. Northern China has been settled too long to afford us the opportunity of seeing much of her original wild arboreal vegetation. In the Pangshan district, however, to the east of Peking, one may still find a few specimens of the real wild walnut. They are found in the mountains, growing in ravines among large bowlders. The trees are smaller and less vigorous in growth than the cultivated ones. The leaves and nuts are also smaller and the latter less sweet than those from cultivated trees, but otherwise there is little difference. (S. P. I. No. 21877.)

CHESTNUTS.

[CHINESE NAME, "Li tze."]

The ordinary Chinese chestnut (*Castanea* sp.) grows wild on the slopes of rocky mountains in northern China and southern Manchuria. It is mostly found in groves, growing among rocks and bowlders, and even in its wild state it varies considerably in the size and flavor of its nuts and the spininess of the burrs. The Chinese name for the wild form is "San li tze." (S. P. I. No. 21875.)

The nuts have been planted to some extent on the mountain slopes by the Chinese, where the trees receive more or less cultivation. All the trees being seedlings, there is very great variation among them in regard to their productivity and the size and relative sweetness of the nuts. The nuts are sold extensively in autumn and early winter in all Chinese towns, after being roasted in sand with which molasses has been mixed. This roasting in sugared sand bleaches the nuts somewhat, makes them shiny, and cracks them open but very little.

The chestnut of northern China is quite distinct from that of Japan; it can stand great heat and drought, and may be especially useful in the Rocky Mountain region of the United States. (S. P. I. Nos. 17876, 17877, and 17896.)

There is a very slender-leaved chestnut found growing in some of the ravines of southeastern Manchuria and northeastern Korea. The nuts are small, but when the tree is in flower it is very ornamental, its snowy-white masses of catkins contrasting vividly with the slender, glossy, green leaves.

In the more elevated mountain regions of China a dwarf chestnut occurs, generally as a shrub several feet high. The nuts are small but very sweet. The whole plant is very similar to the North American chinquapin. It can be used as a fruiting shrub. Its nuts are very sparingly seen in the markets of central China during the early winter.

HAZELNUTS.

Three wild species of hazelnuts occur in the mountains of northern China, Manchuria, and eastern Siberia. They are *Corylus heterophylla, C. mandshurica*, and a third species. They are never cultivated, but the nuts are collected and sold on the markets throughout the Far East. They are inferior to the filbert, but seem to be able to stand, in general, more drought and hardship. For this reason they might be tried in the drier sections of the United States where ordinary filberts do not succeed.

EDIBLE PINE SEEDS.

Pine kernels are sold in fruit stalls and markets all over the Far East and are eaten as delicacies. Most of these come from the *Pinus koraiensis*, which grows as a stately tree in the virgin forests of Manchuria, Korea, and eastern Siberia. They are called "Sung tze." (S. P. I. Nos. 20089, 20090, 20315, 20316, and 23220.)

Besides this pine, there are a few others that supply these kernels. In the Province of Shansi a small round pine kernel is sold. It may be the seed of *Pinus bungeana*. It is called "Kuo tze" and "Sung tze." (S. P. I. Nos. 21997 and 22691.) In southern and central China some very elongated kernels are occasionally to be had. These nuts are often used by the higher classes for cake and pastry.

APRICOT KERNELS.

Foreigners in China are often served in various homes and hotels with so-called almond cake. One of the main ingredients of this cake is sweet kernels, so closely resembling almonds that even intelligent foreigners believe that they are eating genuine almonds. This supposition has given rise to the statement that almonds grow in China. These so-called Chinese almonds are the kernels of a particular kind of apricot (*Prunus armeniaca*), grown exclusively for its seeds.

There are several varieties of apricots that produce these seeds. The best one has small red fruit with large, medium-soft stones and sweet kernels. The tree of this particular variety is of very erect growth, quite distinct from all other varieties of apricots. It is propagated by grafting upon seedling stock.

Another variety bears somewhat larger fruit, also of a red color, but the tree is of an open habit. Then there is a yellow-fleshed variety that resembles the preceding one very much in habit of growth. The stones of the last two varieties are not so easily cracked, however, as those of the first-mentioned kind.

Another variety that came under the writer's notice has a bitter kernel, used only in small quantities to give flavor to confectionery

and to make the so-called Chinese almond soup. In preparing the latter, rice is cooked until it is quite soft, then pounded and mixed with water until it closely resembles milk, then a few bitter "almonds" are ground up and mixed with this rice milk, some sugar is added, and it is served hot. It makes a delicious, stimulating soup of which the Chinese are very fond of partaking in the evening just before retiring.

The sweet apricot kernels are often served with true nuts and raisins. Sometimes they are salted. They look and taste exactly like small salted almonds, so that it really is no wonder that foreigners have come to consider them as a particular kind of Chinese almond. (S. P. I. Nos. 17153, 17845, 18260, and 18261.)

GINGKO NUTS.

[CHINESE NAME, "Pai kua," meaning white nut.]

The gingko (*Gingko biloba*) is grown in China as a much appreciated tree in the courtyards of Buddhist temples and near shrines. The white nuts are eagerly collected, cleaned of the ill-smelling pulp that surrounds them, and sold as a delicacy, especially in central and southern China. They are always slightly roasted before being eaten, but their flavor does not appeal to the palate of the Caucasian race.

CASTANOPSIS SEEDS.

The castanopsis (*Castanopsis tibetana*) is a stately evergreen tree, bearing edible, chestnut-like seeds. The tree grows 100 feet tall and has a trunk several feet in diameter. It bears glossy dentate leaves, dark green above and rusty brown beneath, which sometimes reach a length of 1½ feet and a breadth of 9 inches. The tree is found sparingly in protected mountain valleys in the Chekiang Province. It was discovered in the vicinity of Hangchow by Bishop G. E. Moule, of the Church of England Missionary Society, through whose efforts we were able to obtain a small quantity of the seeds, which are not easy to obtain. The nuts being edible, the priests of the various temples are very fond of them, and the many rodents abounding there also get their share as soon as they ripen, so that one has to be on the spot at the right season to secure a supply.

This castanopsis will probably grow in those sections of the United States where oranges and loquats thrive, where the soil is rich and deep and where some shelter can be afforded to the plants, at least while they are young. (S. P. I. No. 22915.)

WATER CHESTNUTS.

[CHINESE NAME, "Feng ling."]

Peculiar water chestnuts (*Trapa bicornis*), resembling a buffalo head, are extensively grown in all the canals and placid streams of the Chehkiang Province. The Chinese plant them in early spring and protect the plants by means of fences of bamboo stalks staked in the water. The nuts are eaten boiled and taste somewhat like a Jerusalem artichoke.

The labor involved in collecting the seeds and protecting the plants makes this crop one that is not likely to succeed in any country except where labor is exceedingly cheap and plentiful.

VARIOUS EDIBLE SEEDS.

PEANUTS.

Peanuts (*Arachis hypogaea*) are cultivated extensively all over China. They are grown for oil extraction and for food.

The nuts are planted in the spring in sandy soil and are harvested in the fall; but they are considered so valuable that the soil in which they grow is sifted so as to get even the smallest nuts. A field of 10 or 20 acres that has been thus sifted, with the heaps of soil lying on it in regular lines, looks as if manure had been carted on in compact heaps.

There are but few varieties of peanuts in China. The ordinary large kind is the same as seen elsewhere and is called by the Chinese the "foreign peanut." Its introduction seems to be quite recent. It is used almost exclusively as a delicacy, roasted as in western countries.

There is a small variety, however, with a peculiar shrunken skin, that is used in an entirely different way. These nuts are steamed with salt water and kept in weak brine until used. They are everywhere eaten cold as appetizers, and although small are really very palatable and nutritious. Sometimes the kernels are taken out, salted, and served at dinners, but on account of their small size they are being replaced by the larger variety. (S. P. I. No. 22022.)

WATERMELON SEEDS.

Watermelon seeds are in great favor with the Chinese as delicacies, and no one can go to the theater or to a tea house without being offered some. They are always served roasted.

There are several varieties—some red, others black, yellowish, and even white. The red varieties seem to be considered the best. The Chinese grow a few strains of these watermelons solely for their seeds, for which there is always a great demand. It might perhaps be profitable for American farmers to obtain a very large-seeded variety of watermelon and grow it exclusively for its seeds, to be exported to China.

SQUASH AND PUMPKIN SEEDS.

Pumpkin seeds of the species *Cucurbita maxima*, *C. pepo*, and *C. moschata* are roasted and eaten as delicacies all through China, and also by the Russian settlers in eastern Siberia.

BOTTLE-GOURD SEEDS.

Seeds of the bottle gourd (*Lagenaria vulgaris*) are boiled in salted water and eaten when cold as appetizing delicacies by the rural classes in China.

SUNFLOWER SEEDS.

Sunflower (*Helianthus annuus*) seeds are consumed extensively, either roasted or raw, as delicacies, all through China and Siberia. The black and white striped seeds seem to be the most in favor and are grown in great quantities for domestic use.

FIRMIANA SIMPLEX.

The seeds of the plant frequently known as *Sterculia platanifolia*, the correct name of which is *Firmiana simplex*, which is grown all through China as a favorite shade tree, are sold sparingly as delicacies in central China. They are far from being of good flavor, however, and as a food will never become of any importance to western races.

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